
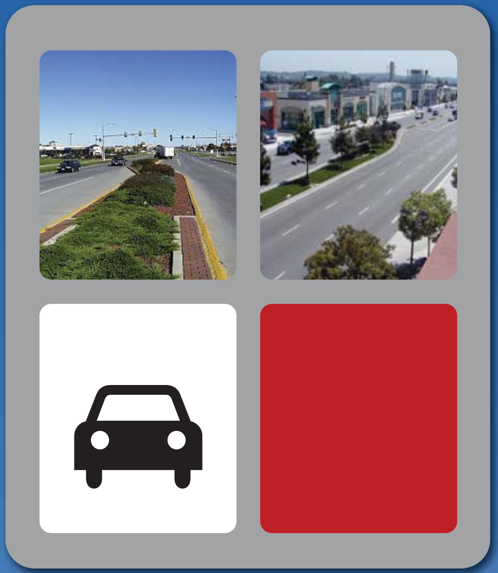


FM 517 and SH 3 Access Management Plan

Kimley-Horn and Associates, Inc.

in association with

Subconsultants:

CJ Hensch & Associates, Inc.
AIA Engineers, Ltd.
Knudson, LP

Agencies:

H-GAC
TxDOT
City of Dickinson
City of League City
Connect Transit

Final Report September 2013

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Funding Partners: H-GAC
Texas Department of Transportation (TxDOT) - Houston District

Project Partners: Houston-Galveston Area Council (H-GAC)
Texas Department of Transportation
City of Dickinson
City of League City
Galveston County

Consultant Team: Kimley-Horn and Associates, Inc.

In association with
AIA Engineers, Ltd.
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9/25/13
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The steering committee and consultant team would like to thank all the citizens, staffs, and elected officials along the FM 517 and SH 3 corridors for their assistance with the development of this plan.

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Chapter 1

Introduction

The Houston-Galveston Area Council (H-GAC) has served as the Metropolitan Planning Organization for transportation planning in the eight-county Houston region since 1974. This area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties (see **Figure 1-1**). A significant function of H-GAC is to help the region spend its transportation funds in a way that improves mobility, supports economic progress, and safeguards the environment. Each year, H-GAC oversees the investment of more than $3 billion in transportation improvement projects and provides a forum for interagency cooperation and public input into funding decisions. H-GAC also sponsors and conducts studies, assists county and municipal planning agencies, and monitors compliance with national air quality standards. H-GAC's Transportation Policy Council approves the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP).

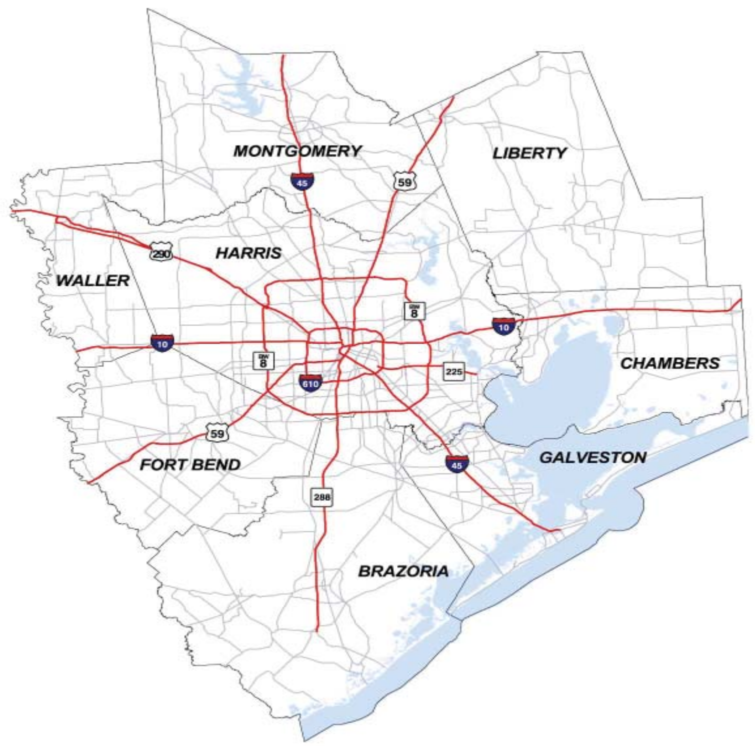

Figure 1-1: Metropolitan Planning Area

According to H-GAC's Regional Transportation Plan (RTP) (**Figure 1-2**), the Houston-Galveston region's population is expected to reach 8.8 million by 2035. Employment forecasts reflect similar growth with jobs reaching approximately 4 million by 2035 (source HGAC 2035 RTP). This will potentially provide many opportunities for economic growth and diversification of the local economy; however, it also presents many challenges to the natural and built environment. If the transportation network cannot provide an acceptable level of service (LOS) along the main travel corridors, the economy, community, and environment will deteriorate.

Figure 1-2: H-GAC Regional Transportation Plan

Providing a viable transportation system to accommodate projected regional growth involves building new roadways, adding transit, encouraging mode-diverse corridors, and managing access and demands for system travel. "Access management" is the implementation of strategies designed to enhance transportation improvements while making the best use of existing transportation facilities. Using strategies such as intersection capacity improvements, adequately spaced driveways, raised medians, encouragement of multi-modal connections, and land-use planning, access management can significantly improve the level of efficiency, effectiveness, and most importantly, safety of the transportation system.

1.1 STUDY PURPOSE

The purpose of this Access Management Study is to develop an implementation plan of transportation improvements along FM 517 and SH 3 that reduces crashes, improves mobility and accommodates existing businesses as well as future development. The study area (**Figure 1-3**) is defined as FM 517 from Cemetery Road to Gum Bayou (7 miles) and SH 3 from Hughes Road to FM 518 (5 miles). Both of these corridors are maintained by TxDOT. FM 517 is the primary arterial for serving eastbound and westbound travelers, while SH 3 runs parallel to IH 45 and serves northbound and southbound traffic.

Improvements to these corridors are intended to increase safety by modifying some of the roadway locations that experience high crash rates. The recommendations also seek to enhance the mobility of the region by creating a network with improved vehicular flow to help alleviate some of the congestion that occurs in high-density areas. Finally, accessibility and safety for pedestrians and bicyclists will be upgraded through a continuous sidewalk system and shared use lanes. All of these enhancements will result in a more aesthetic, safe, and mobile transportation network serving local and regional traffic.

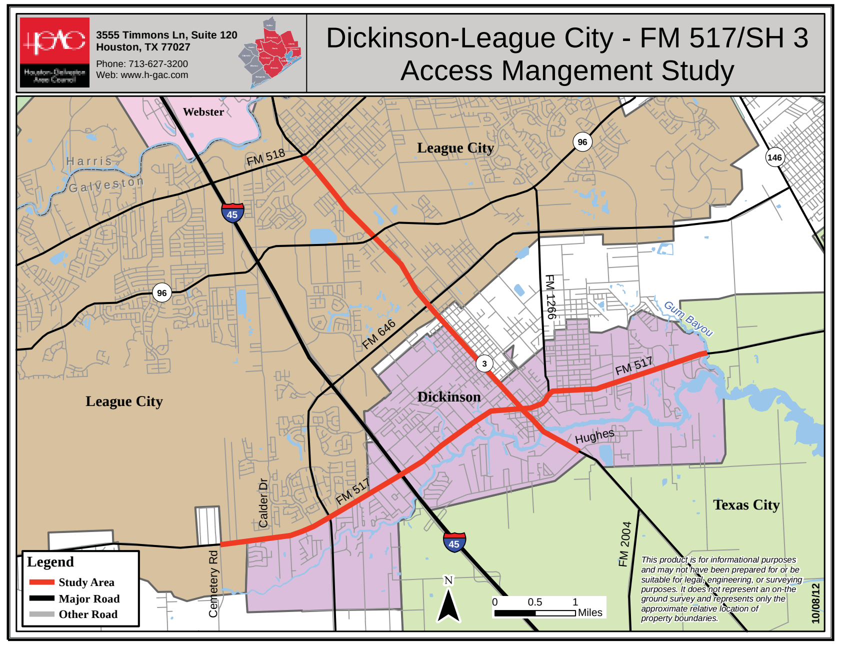

Figure 1-3: Study Corridor

1.2 PROJECT TEAM

H-GAC partnered with the Texas Department of Transportation (TxDOT), to fund the study through the Surface Transportation Program. The consultant team was selected in December 2012 and the following members were invited to provide input and guidance for the project as part of the Steering Committee:

Agency and Jurisdiction Partners:

- H-GAC
- TxDOT
- City of Dickinson
- City of League City
- Galveston County
- Connect Transit

Consultant Team:

- Kimley-Horn and Associates, Inc.
- AIA Engineers, Ltd.
- Knudson, LP
- CJ Hensch & Associates, Inc.

1.3 STUDY PROCESS

Major steps in the access management study included collecting data, analyzing existing conditions, establishing goals, and recommending corridor access management improvements. It was important to consider input from those who were most significantly affected by the changes proposed for the FM 517 and SH 3 corridors. Steering committee meetings with the agencies previously listed and stakeholder meetings with property owners and citizens in the area helped shape the foundation of the access management study. Public meetings were also conducted to allow residents and other facility users to voice opinions and express ideas. Keeping the public informed and involved ensured that specific needs of the region were considered when recommending improvements.

The implementation of improvements for the FM 517 and SH 3 corridors was recommended to be either short-, medium-, or long-term. Heavily congested or high crash density areas were short-term improvements, while less critical sections of road were recommended as long-term improvements. The prioritized list of improvements was developed based on a technical analysis of crashes and mobility as well as input from the public involvement process. The project steering committee provided crucial insightful guidance and review oversight. The study team used guidance from these various groups to identify and evaluate appropriate access management and mobility tools that best fit the public's issues and desires. **Figure 1-4** illustrates the study's general schedule.

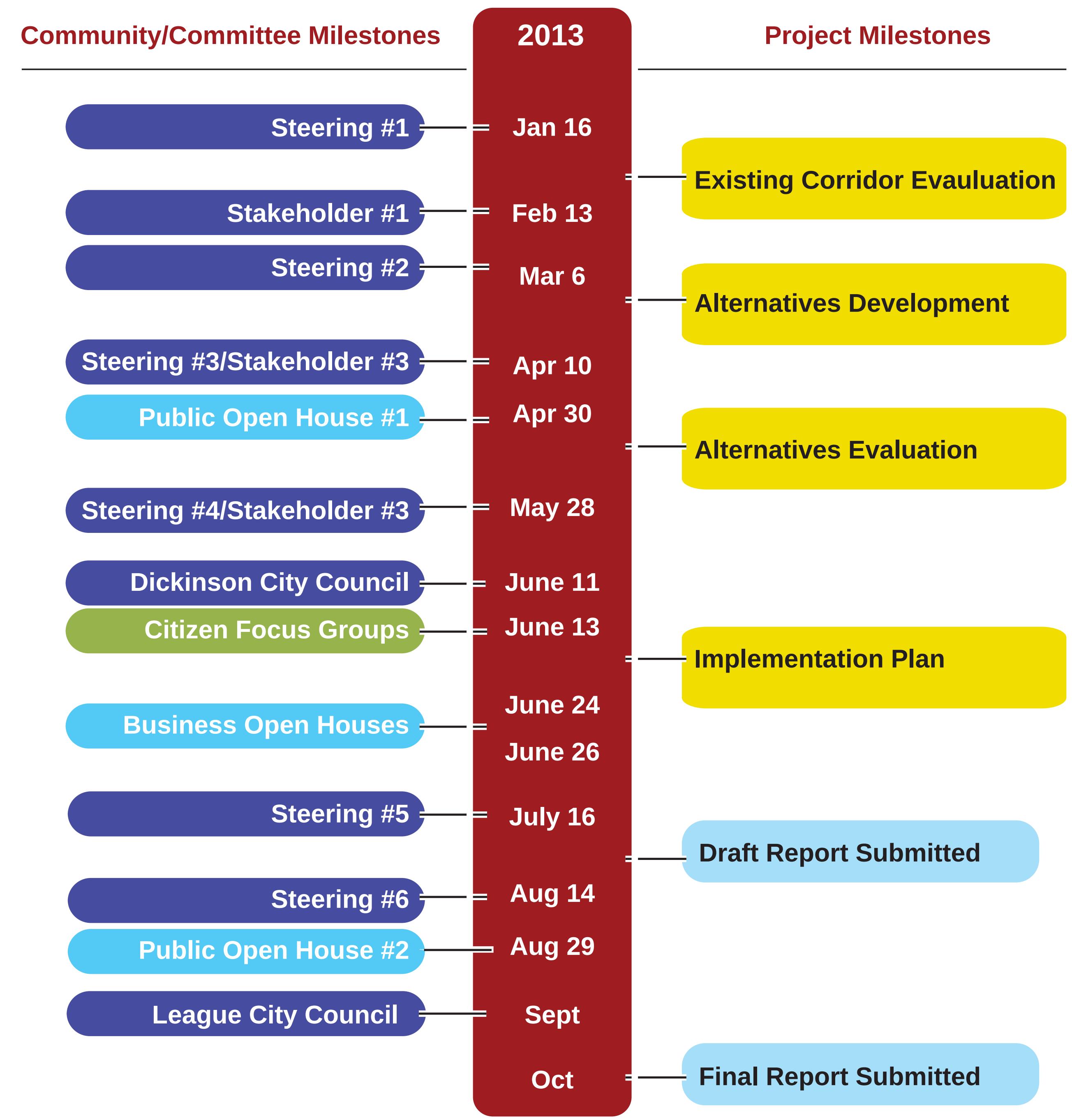

Figure 1-4: Schedule

Chapter 2

Public Involvement Process

2.1 PUBLIC INVOLVEMENT INITIATIVE

H-GAC actively engages the public in the decision-making process through:

- Maintaining an open public process;
- Engaging agency decision makers;
- Utilizing a variety of public involvement techniques that reach a wide audience; and
- Integrating ideas from the public.

H-GAC has outlined a public involvement process that achieves these initiatives and provides the team with invaluable guidance for future improvements within the FM 517 and SH 3 corridors.

2.2 PUBLIC PARTICIPATION OBJECTIVES

The public involvement process is driven by these primary objectives:

- Initiation of citizen participation at the onset of the study and continued throughout the process.
- Intensified efforts to solicit community views prior to major project decision points.
- Public access to all relevant information.
- Regular reports of study findings to the public.
- Provision of orientation materials to accommodate new participants entering the process.
- Two-way communication between the study team and community participants to freely exchange information, ideas, and values.
- Presentation of transportation options in an objective manner.

- Use of a variety of techniques and approaches to reach a diverse group of persons potentially affected by the proposed project.
- Serious consideration of all suggestions from the community.
- Timely response with answers and information to citizen inquiries.
- Complete documentation of public involvement activities.
- Incorporation of small discussion groups to encourage a casual environment for discussions during public meetings.
- Evaluation of the public involvement plan's effectiveness.

2.3 TARGETED GROUPS

Three primary groups were targeted for the FM 517/SH 3 public participation plan: 1) steering committee, 2) stakeholders, and 3) general public. Each group provided unique perspectives to the project.

Steering Committee

The steering committee was comprised of a group of local technical experts and policy decision-makers, including representatives from the Texas Department of Transportation (TxDOT), H-GAC, Cities of Dickinson and League City, as well as Connect Transit. The committee met at key milestones in the process to receive and assess reports on progress, comment on schedule, coordinate with their respective agencies, and provide oversight of major activities associated with the study. This group provided details on current and future plans as well as policies and standards used in the process. The committee provided technical guidance related to project goals, measures of effectiveness, and project tools employed in the corridor.

The steering committee met at either the Dickinson Public Library or Dickinson City Hall on the following dates:

- January 16, 2013
- March 6, 2013
- April 10, 2013
- May 28, 2013
- July 16, 2013
- August 15, 2013

Stakeholders

The FM 517/SH 3 corridors have many stakeholders affected by transportation issues along the corridor, including the following:

- Residents
- Civic and homeowner organizations
- Businesses and chambers of commerce
- Schools and churches
- Police, fire, and ambulance service providers
- Landowners, developers, and real estate professionals
- Environmental and historic preservation groups

The team held several meetings to educate stakeholders on access management and the overall study process. The primary function of these meetings was to determine individual concerns and/or issues and possibly incorporate those issues into the study recommendations. These stakeholder meetings focused on the community that is affected daily by the corridor — the people that live and work in the corridor and have an intimate knowledge of the issues affecting the region.

- The Dickinson Stakeholder Group was comprised of the Dickinson Planning and Zoning Commission, the Dickinson Management District, Dickinson Economic Development Corporation, and the North Galveston County Chamber of Commerce. The stakeholder meetings were held at the Dickinson Public Library on the following dates:
  - February 13, 2013
  - April 10, 2013
  - May 28, 2013
- The participants of the Dickinson Focus Group meeting included a small group of citizens that attended the first public meeting and the study team. The purpose of the meeting was to gather input from a group of involved citizens on the phased implementation plan for FM 517 and SH 3. The Dickinson Focus Group meeting was conducted on June 13th, 2013 in the Dickinson City Council Chambers.
- Business Open Houses invited all businesses in Dickinson along FM 517 between FM 646 and IH 45 and in League City along SH 3 between SH 96 (League City Parkway) and FM 518 (Main Street). The Dickinson Business Open House was held at Dickinson City hall while the League City Business Open House was held at the Civic Center on the following dates:
  - League City – June 24, 2013
  - Dickinson – June 26, 2013

General Public

The intent of the public involvement plan was to promote honest, active, two-way communication with the public. This involved actively listening to their concerns and keeping them informed about the study's progress so that all community factions had the opportunity to participate and know that their concerns were being addressed.

Public meetings were a major component of this two-way communications effort and were scheduled during key stages of the project. The first public meeting relayed the purpose, process, and progress of the study, engaged the public in providing specific input on corridor activities and characteristics, and presented initial recommendations. Short-, medium- and long-term recommendations were presented in the second public meeting.

The first public meeting was held at Dickinson High School on April 30, 2013, and the second public meeting was held at the League City Civic Center on August 29, 2013.

2.4 SCHEDULE OF ACTIVITIES

Public involvement activities were scheduled so that critical input was obtained at key stages of the study, keeping the project moving forward. Two public meetings, six stakeholder meetings, six steering committee meetings, and two city council meetings were held for this study. As other opportunities arose to present study findings, such as standing meetings of local business and focus groups, the team scheduled additional public outreach activities.

2.5 OUTREACH APPROACH

H-GAC employs a variety of methods, from high-tech tools to high-touch meetings, to reach people of all ethnic and socioeconomic backgrounds. Dynamic communication tools and comprehensive meeting notification techniques were employed to provide education and awareness of the project and to maximize public input to direct future implementation.

Dynamic Communications Tools

Presentation Materials. The study team used presentation materials with clear graphics at steering committee, stakeholder, and public meetings to assist the public in understanding technical concepts. Graphics included presentation boards, PowerPoint presentations, handouts, and other communications tools. The materials explained overall access management concepts as well as corridor-specific topics, such as the study process and goals, project schedule, and funding partners. The materials also conveyed technical results for each stage of the study. Team members knowledgeable of the project were available at meetings so that attendees could ask questions and receive direct responses regarding the project.

Project Maps. Another important technique used to engage the public was detailed aerial maps. These maps allowed the project team to gather specific comments on the public's knowledge of the corridor (locations of developments, high crash locations, problem intersections, etc.) and suggested improvements. Furthermore, these maps were documented as part of the public participation process and became a formal portion of the project record.

Comprehensive Meeting Notification

As part of their goal to make diligent efforts to involve the public, the federal government has set forth public involvement requirements (23CFR450.210) in their Code of Federal Regulations (CFR). The outreach approach for FM 517/SH 3 in compliance with the CFR directives for publication and notification of public meetings. It also complied with TxDOT Houston's guidelines for the sequence and types of notices. The specific outreach components included the following:

- Elected officials notification letter from Alan Clark, H-GAC's Director of Transportation as the first publicity item, in keeping with TxDOT Houston's preference for notifying elected officials about public meeting opportunities prior to any other advertisements or mailings.
- Postcard in English and Spanish mailed to property owners and stakeholder groups 2 weeks prior to the meetings.
- Website posting on H-GAC's Transportation Public Information page.
- Facebook posting on H-GAC's public profile.
- Dynamic messaging signs posted by TxDOT on eastbound and westbound lanes of FM 517 and north- and southbound lanes on SH 3 a few days prior to the meeting.
- Updated mailing list from the sign-in sheets of each stakeholder and public meeting (to make sure individuals who have expressed interested in the project receive ongoing updates of public involvement activities)

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Chapter 3

Corridor Goals

From the beginning of the planning process, the study team strived to create an interactive relationship with the affected citizens and an environment that encourages communication, growth, and participation. It was crucial to define specific project goals so that accomplishments could be measureable. Essential project objectives involved being open and transparent when conveying information and providing easy methods of public input. The project team worked with the steering committee, stakeholders and the general public to set and practice these goals.

- Improve safety for all modes of transportation.
- Improve mobility.
- Create a strategy for the corridor that provides guidance for access management without hindering development.
- Improve multi-modal connections in the corridor.
- Maintain an open public process.
- Implement a uniform access management policy.

FM 517 at FM 646

Improve safety for all modes of transportation

Crash analysis can identify problem areas along a corridor and expose the effects of crashes from a financial perspective. Access management has proven to increase corridor safety in past implementation and can reduce the probability of crashes, which are often accompanied by damaging consequences. Increased corridor safety will be evaluated using the following measurements:

Measure 1: Crash rate reduction — A crash reduction analysis was performed based on studies that have been done on similar situations in the past. It estimated the difference in crashes that will happen if access management is implemented when compared to the existing configuration.

Measure 2: Crash cost-savings — Crash costs refer to the economic value of damages and losses caused by collisions. The costs of various crash types were based on the FHWA's Highway Safety Improvement Program published in 2009. Access management will result in fewer crashes along the corridors, and consequently, a crash cost-savings.

Improve mobility

Improvements in mobility can be achieved by reducing motorist delay and overall travel time for the corridor. The public helped us determine and verify the locations where congestion is most prevalent and where mobility improvements are needed. Examples are FM 517 between FM 646 and IH 45 and SH 3 between Walker and FM 518.

Measure 1: Travel time benefits — Travel time improvements were estimated with the proposed improvements and converted into cost savings based on an average driver's value of time.

Create a strategy for the corridor that provides guidance for access management without hindering development

All recommendations have the area's economic growth and development goals in mind by providing improved mobility as well as access to all businesses, residences, and other facilities. The strategy provides policies with standards and design minimums for improved development. The final product will transform that area to include improved roads that lead to a city with pedestrian-friendly businesses and shopping destinations.

- Upgrade the two major thoroughfares (FM 517 and SH 3) that serve significant traffic levels to improve access to existing businesses and future development.
- Improve the curb appeal for the area with a combination of public investments and private incentives.
- Improve local employment opportunities by encouraging retail and other businesses that attract residents and visitors.
- Encourage quality development that reflects favorably on the city.

Improve multi-modal connections in the corridor

Provide multi-modal facilities that encourage safe and efficient pedestrian and bicycle use.

Measure 1: Increase the availability and length of pedestrian accommodation facilities — Sections of the corridors that are currently lacking sidewalks will be upgraded to have a more continuous sidewalk network. Similarly, certain sections of roadway will be constructed with outside lanes that are wide enough to accommodate both bicyclists and motorist.

Maintain an open public process

The planning process included the following meetings:

- 2 public open house meetings
- 6 steering committee meetings
- 6 stakeholder meetings
- 2 city council meetings

Implement a uniform access management policy

Imposing a consistent access management policy will help the area adapt current development access, and enforce future development to keep the planning goals of the corridors in mind. Because the access management policy will be implemented in phases, each jurisdiction will be able to work with TxDOT in constructing the improvements based on priority and the access management policies.

SH 3 at FM 518

Chapter 4

Existing Conditions – FM 517

4.1 EXISTING TRAFFIC CHARACTERISTICS

Daily Traffic Volumes

Average annual daily traffic (AADT) counts were provided by TxDOT for each of the sections along the corridor, as shown in **Table 4-1**.

Table 4-1: Daily Traffic Volumes – Year 2011

FM 517 Corridor Section	AADT
Cemetery to FM 646	19,400
FM 646 to Fire Station 2	22,000
Fire Station 2 to IH 45	27,000
IH 45 to FM 1266 / Dickinson Avenue	17,300
FM 1266 / Dickinson Avenue to Gum Bayou	16,100

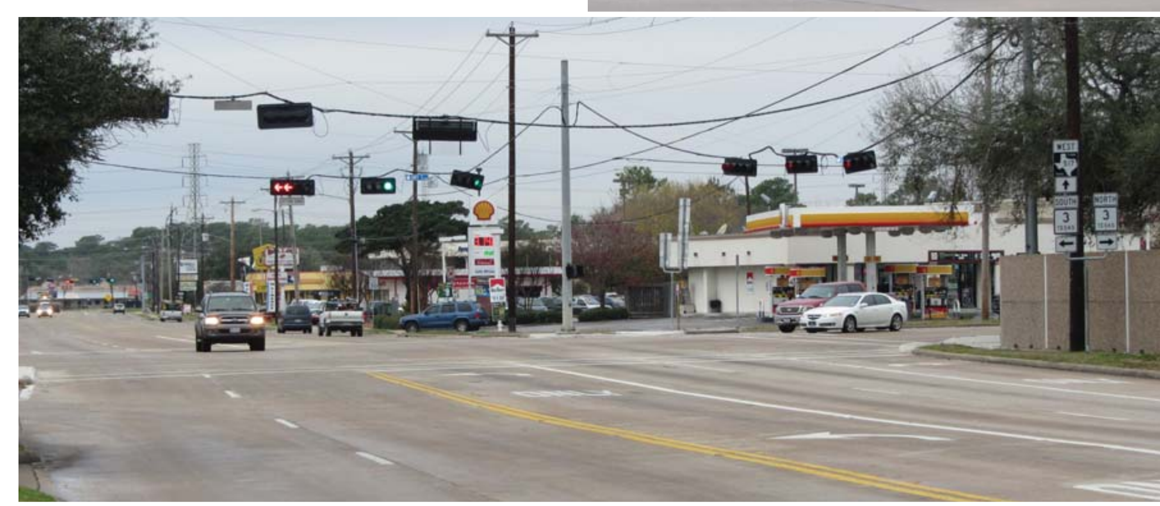
Current posted speed limits along the corridor were recorded and are shown in **Table 4-2**. The sections west of IH 45 and east of Dickinson Avenue have higher speeds (range between 40 and 55 MPH), while sections between IH 45 and Dickinson Avenue have lower speeds (less than 40 MPH).

Table 4-2: Corridor Speed Limits

Section	Speed Limit
Cemetery to Calder Drive	55 MPH
Calder Drive to Medical Park Drive	50 MPH
Medical Park Drive to Cedar Drive	40 MPH
Cedar Drive to Kansas Avenue	30 MPH
Kansas Avenue to Green Isle Avenue	40 MPH
Green Isle Avenue to Gum Bayou	45 MPH

FM 517 at IH 45

Connect TRANSIT



FM 517 at SH 3

Figure 4-1: Existing Conditions for FM 517 from Cemetery Road to FM 646

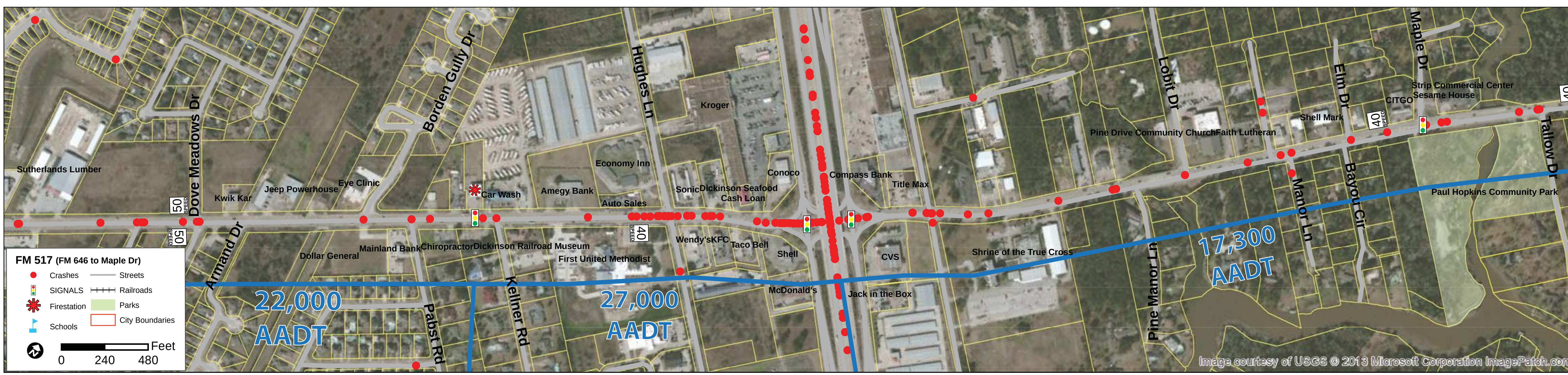


Figure 4-2: Existing Conditions for FM 517 from FM 646 to Tallow Drive

FM 517 and SH 3 Access Management Plan

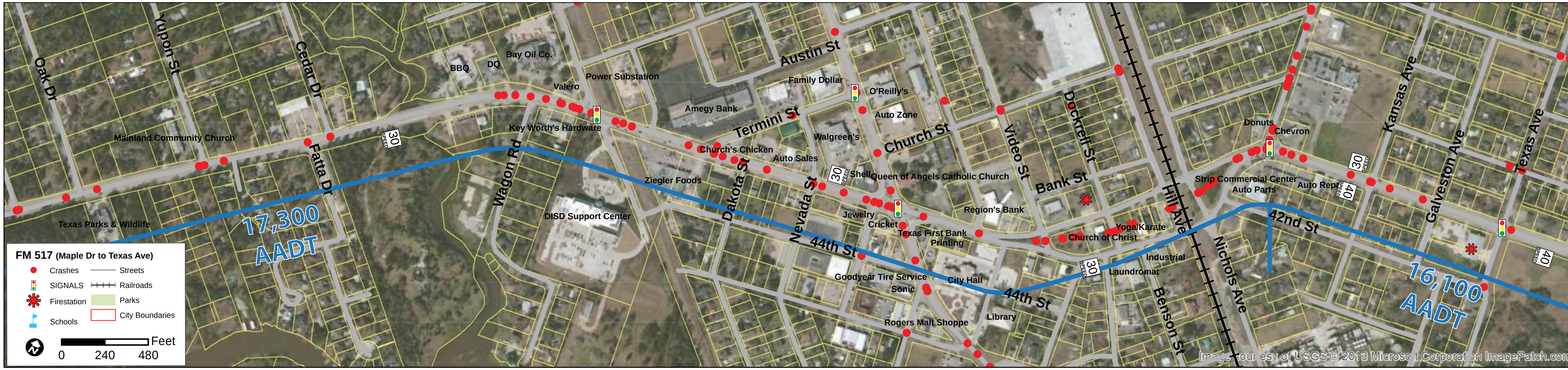


Figure 4-3: Existing Conditions for FM 517 from Tallow Drive to Texas Avenue

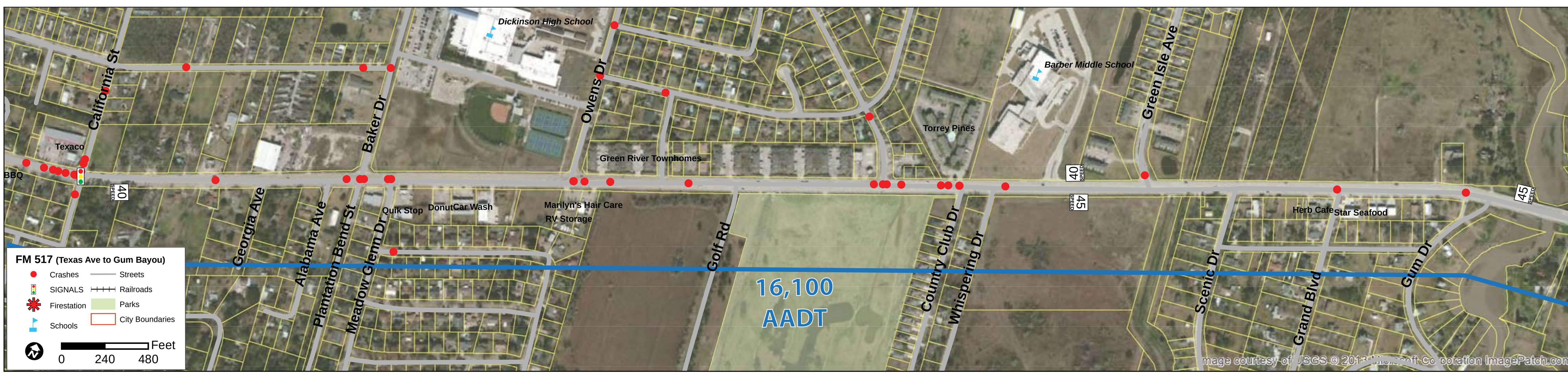


Figure 4-4: Existing Conditions for FM 517 from Texas Avenue to Gum Bayou

Crash Analysis

TxDOT provided crash data for the FM 517 corridor for 2007 through 2011. The study team analyzed the crash data based on location, severity, and type. Of the 656 total crashes along the corridor, 464 (more than 70%) did not result in an injury, and only one fatal crash occurred in the 5 years with crash data. **Figure 4-5** shows the breakdown of crash types ranging from non-injured to fatal.

Average annual daily traffic volumes (provided by TxDOT) were used to estimate vehicle miles traveled (VMT). These values were then used to calculate the crash rates for sections of the FM 517 corridor. It can be seen that the crash rates, shown in **Figure 4-6**, for three of the four sections of the FM 517 corridor are well above the state average for a similar type of farm to market road. In fact, the average crash rate for the FM 517 corridor is 46% higher than the statewide average. Considering this unusually high crash rate, it would be beneficial for the roadway users if efforts were focused on increasing the general safety of this corridor.

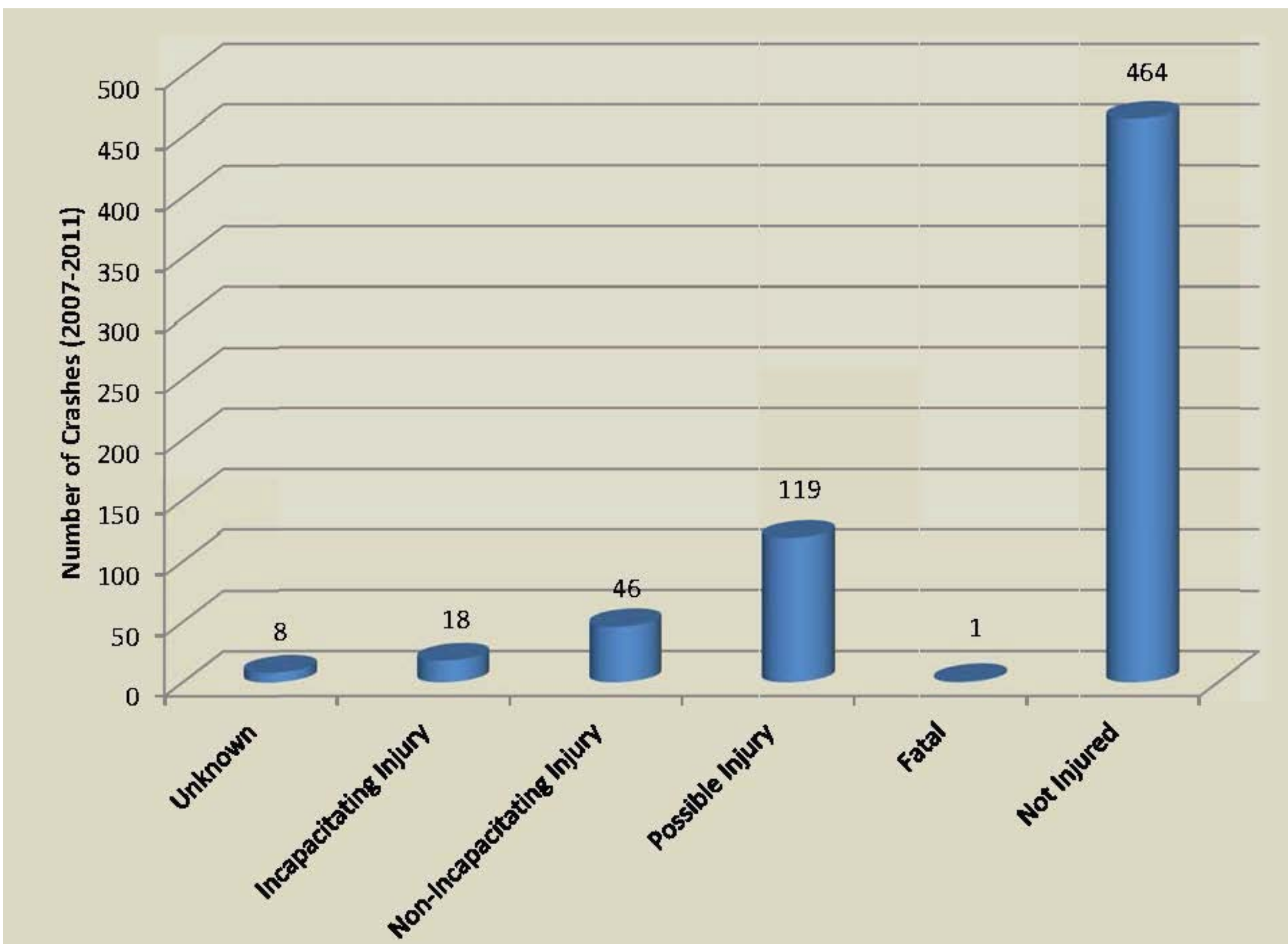


Figure 4-5: FM 517 Crash type

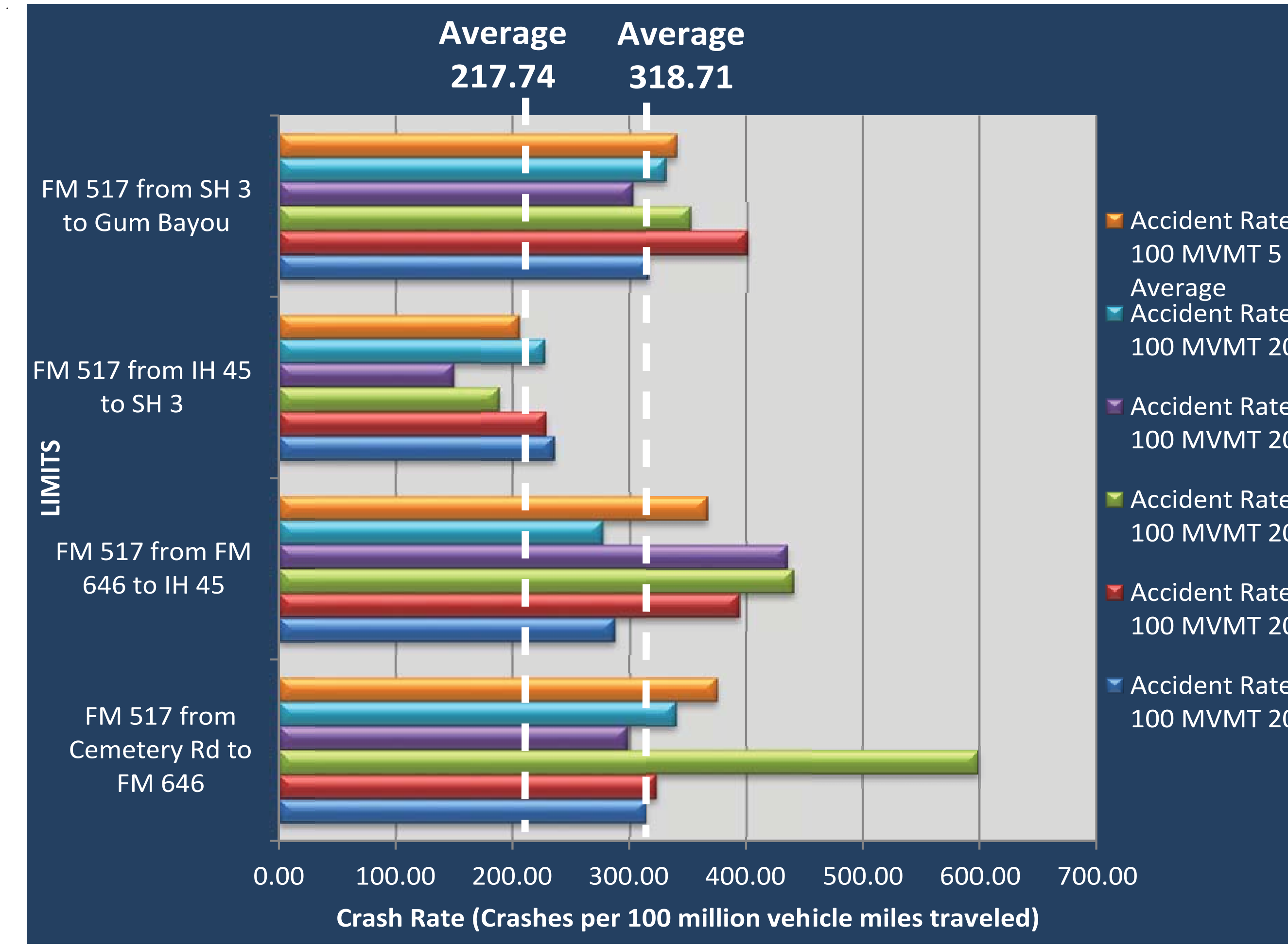


Figure 4-6: Crash rates for 2007-2011 before improvements

The type of collision was analyzed and is described in **Figure 4-7** (on the following page). While it is difficult to always determine reasons for collisions, certain patterns often become apparent. The FM 517 crash analysis revealed that 40% of the crashes were a result of left turning and rear end collisions, which are typically attributable to corridors with a high number of driveways and continuous two-way left-turn lanes.

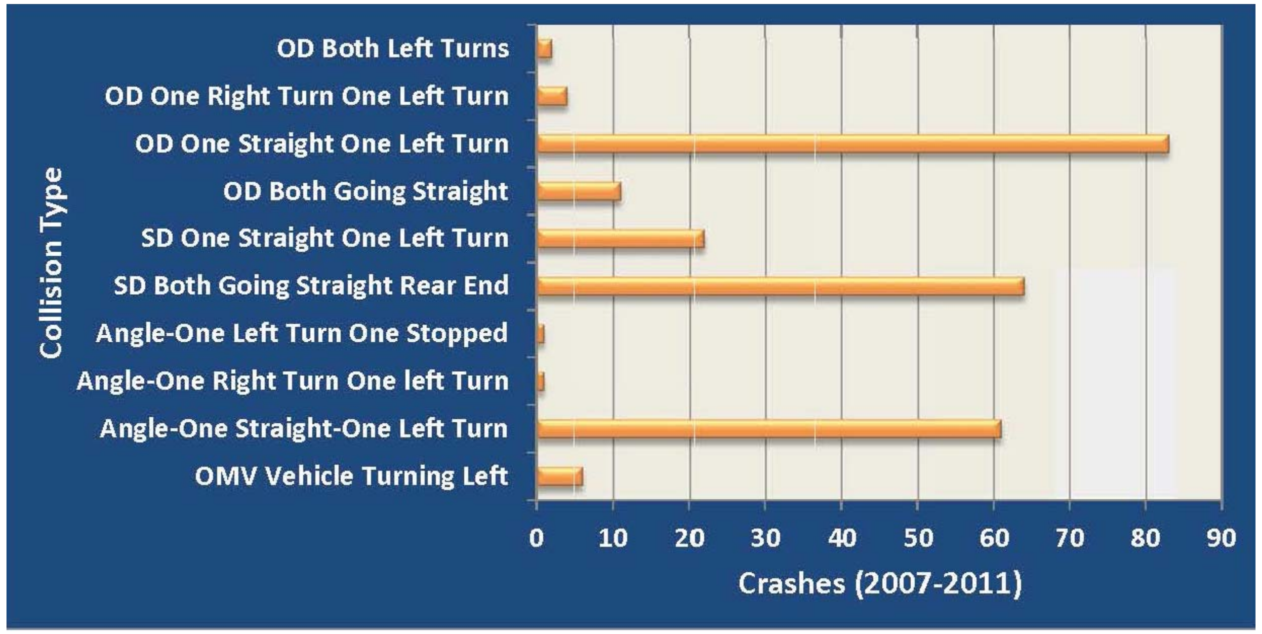


Figure 4-7: Collision Types for 2007-2011

The section just west of IH 45 resulted in the highest crash rates for the corridor. This area contains a high number of driveways, with some businesses providing multiple driveways. A major grocery store and other businesses are accessed by a driveway less than 250 feet west of IH 45. The proximity to IH 45 congestion, high number of driveways and continuous two-way left turn lane are factors that contribute to high crash rates for this section of FM 517.

Another area of concern is the section of FM 517 from Cemetery Road to FM 646. This two-lane section has the highest speed on the corridor and a two-way left turn lane. This area is dominated by residential development. There is a slight curve in this section of the road between Lovers Lane and Bentwood Bay Drive that poses potential safety issues. It has been reported that vehicles slowing down to turn right are occasionally passed by other vehicles in the two-way left turn lane.

The section just east of the FM 517 and SH 3 intersection to FM 1266 (Dickinson Avenue) is a one-way pair alignment with property between the two directions of travel and an at-grade railroad crossing. Both ends of the one-way pair have curves and the signalized intersection of Main, Park, Dickinson, and 41st street is complicated by numerous driveways to businesses.

4.2 ROADWAY AND ACCESS INVENTORY

Roadway Cross-Section

Beginning from Cemetery Road on the west side of the FM 517 corridor, the roadway has one 12-foot lane in each direction, with a 14-foot two-way left turn lane, 5 foot shoulders and drainage ditches on either side (**Figure 4-8**). The only existing sidewalks are in front of the Jordan Cove Apartments just west of Bay Sky Drive. From FM 646 to Spruce Drive (**Figure 4-9**), FM 517 is a curb and gutter section separated by a continuous two-way left-turn lane. Sidewalks are discontinuous, having been provided to serve more recent development. Both of these configurations fit within a ROW width of 100 feet. The two 12-foot lanes in each direction with a 14-foot two-way left turn lane along with the curb and gutter section continue east of Spruce Drive to Timber Drive (**Figure 4-10**), and Timber Drive to SH 3 (**Figure 4-11**), within a ROW width of 90 feet. Sidewalks are more consistently continuous throughout this heavily residential area.

East of SH 3, the existing roadway in the eastbound and westbound directions splits apart, forming a divided one-way pair, then rejoins again at FM 1266 (Dickinson Avenue). The one-way pair contains multiple buildings, including a church and a yoga studio, three cut-through cross streets, and a railroad crossing. Each direction is comprised of two 12-foot lanes with curb and gutter, along with sidewalks (**Figure 4-12**). The ROW width varies greatly throughout this section of roadway. Then from Dickinson Avenue, two lanes in each direction, a two-way left turn lane, curb and gutter and sidewalks accommodate traffic until Gum Bayou, which is the eastern limit of the FM 517 corridor study area. This section has a ROW width of 90 feet (**Figure 4-13**).

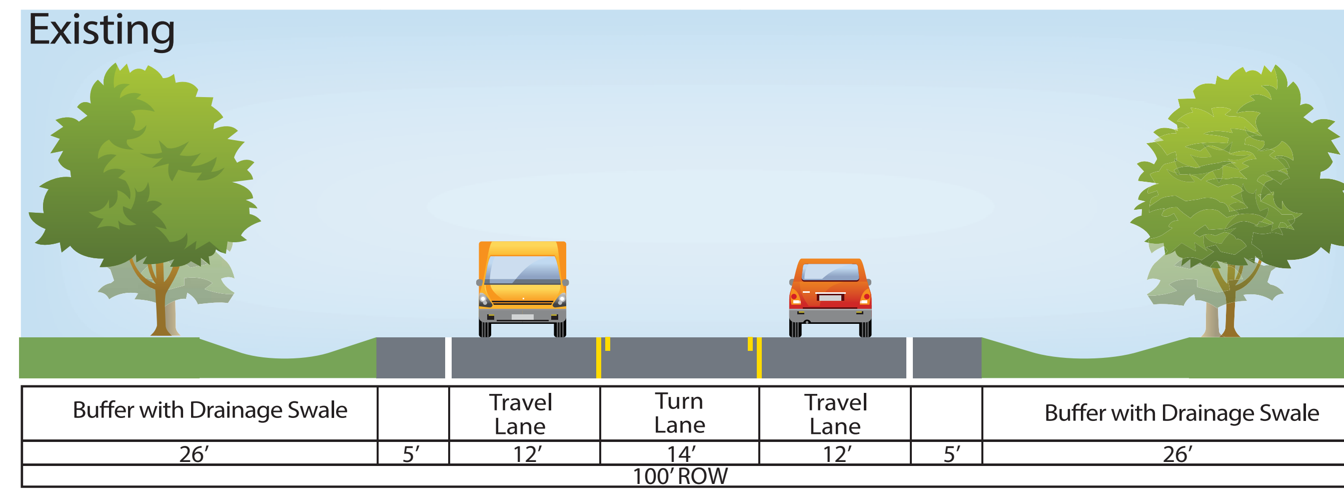


Figure 4-8: FM 517 - Cemetery Road to FM 646

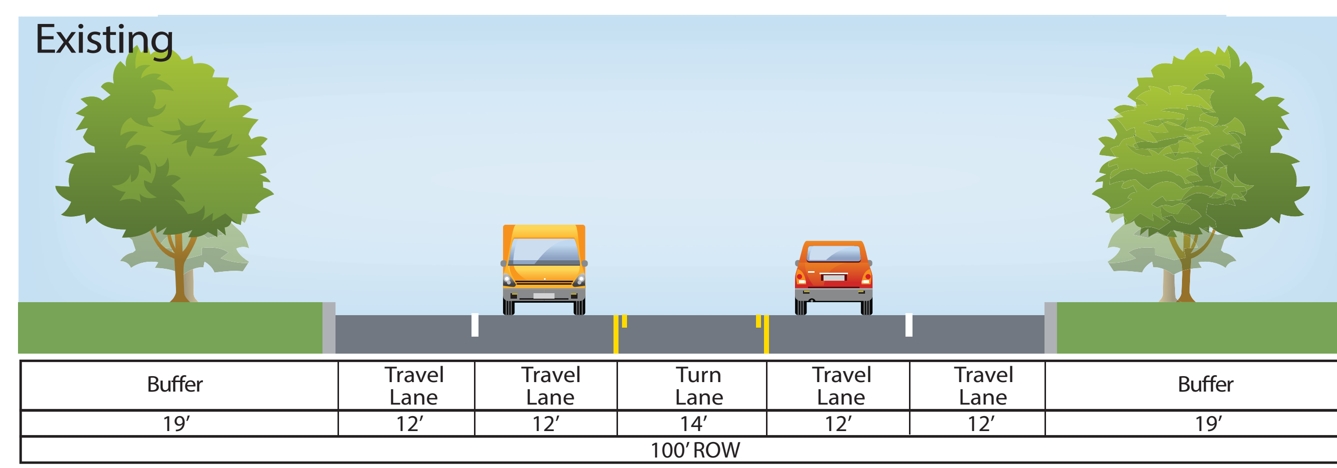


Figure 4-9: FM 517 - FM 646 to Spruce Drive

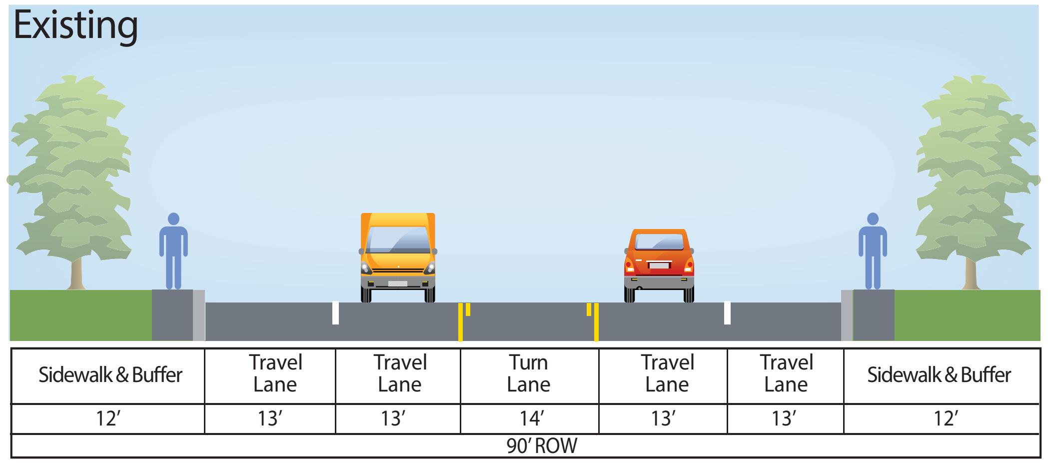


Figure 4-10: FM 517 - Spruce Drive to Timber Drive

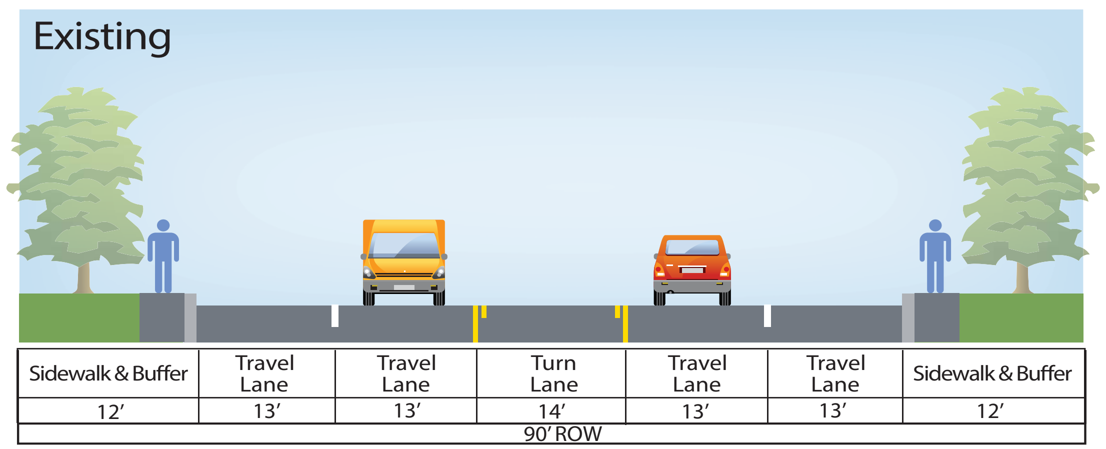


Figure 4-11: FM 517 - Timber Drive to SH 3

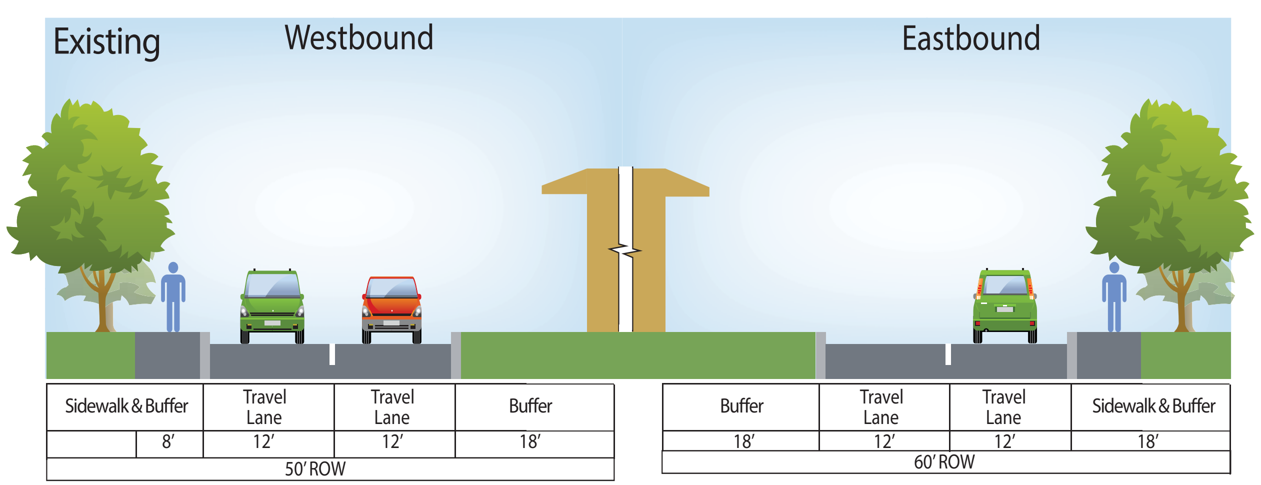


Figure 4-12: FM 517 - SH 3 to FM 1266 (Dickinson Avenue)

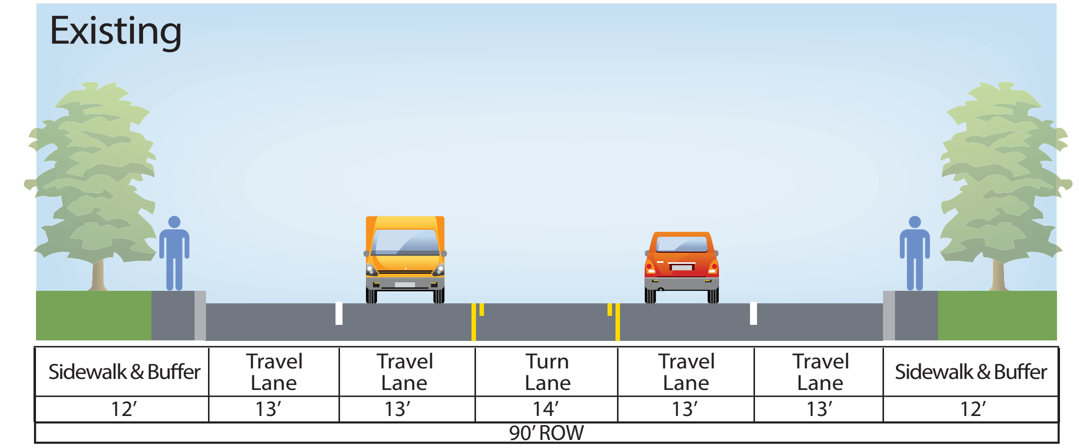


Figure 4-13: FM 517 - FM 1266 (Dickinson Avenue) to Gum Bayou

Traffic Signals

TxDOT maintains all ten of the signalized intersections running along the 6.7-mile FM 517 corridor. The traffic signals along the corridor operate as a time-based, coordinated system. Time-based coordination relies upon each traffic controller clock to maintain proper time in order to coordinate appropriately with other signalized intersections, rather than using a "master traffic signal controller" that maintains the correct time for the entire set of intersections. In other words, the signalized intersections are not linked as part of a corridor communication system. If the internal traffic signal controller clocks are not synchronized, the coordination between signals worsens. Given the spacing between signalized intersections, communication will not provide significant benefit for signal coordination for the entire corridor. However, coordination for several of the intersections, specifically between Timber Drive and Owens Drive that are more closely spaced, could improve traffic operations.

Railroad Crossings

FM 517 crosses the Union Pacific Railroad (UPRR) east of downtown in the segment where FM 517 is a one-way pair. These two crossings are single track and the UPRR estimates that an average of 12 trains pass through the area per day. Each train varies in the number of cars it pulls, so there is no consistent delay time that vehicles experience waiting for each train. However, vehicles are delayed on average approximately five minutes per train crossing. This causes congestion, as FM 517 is the only major railroad crossing in the area and runs directly through the middle of the city. This section of the railroad actually has a crossing for each direction of the one-way pair configuration of FM 517. It also has significant horizontal curves as the two one-way sections merge at Dickinson Avenue.

Transit Operations

Connect Transit (part of the Gulf Coast Center, a special services agency for Galveston and Brazoria Counties) provides a fixed route bus that navigates in the study area **(Figure 4-14)**. Also, a transit study is being performed by Goodman Corporation to determine the feasibility of implementing commuter rail between Galveston and Houston serving a number of communities including Dickinson and League City (**Figure 4-15**). The existing rail that runs parallel to SH 3 would be utilized for the new commuter rail. The addition of this new form of public transportation is expected to increase the economic value of the region, support growth, and enhance mobility and connectivity.

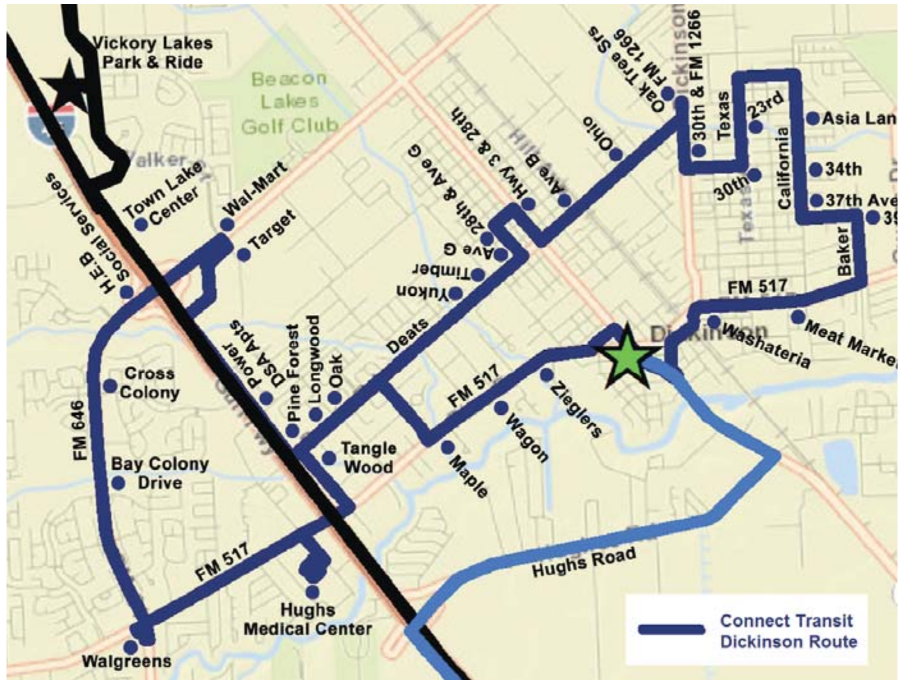


Figure 4-14: Connect Transit-Dickinson Route

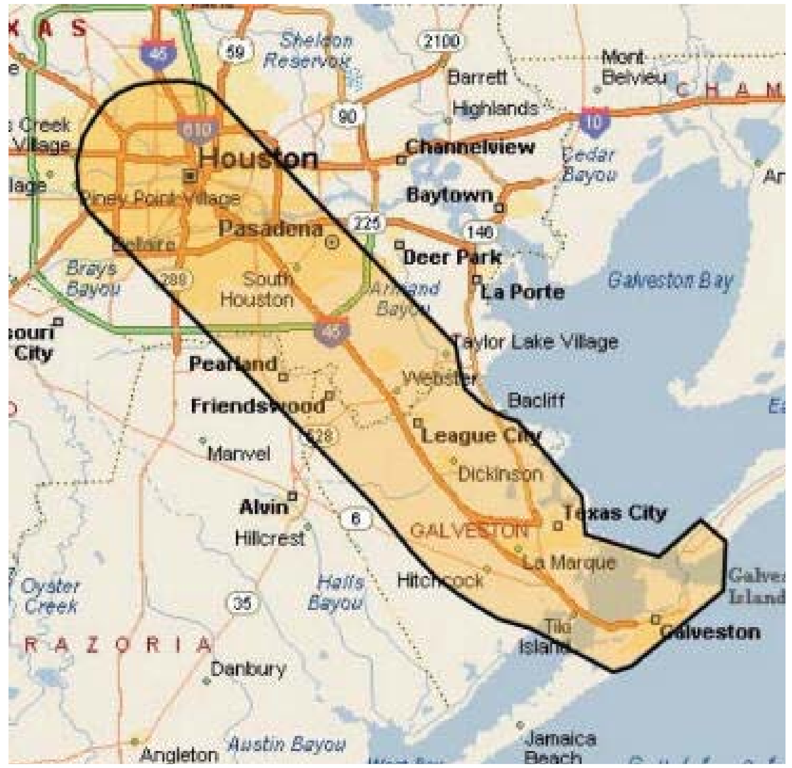


Figure 4-15: Houston-Galveston Commuter Rail Study Area
for Gulf Coast Rail District

Access

The FM 517 corridor has clusters of driveways in close proximity to other driveways and/or intersections, making it either difficult or confusing for vehicles to make their desired turning movement at the driveway. **Figure 4-16** below shows the driveway density along the corridor. The highest driveway density occurs near IH 45 as well as the SH 3 intersection. According to the National Cooperative Highway Research Program's (NCHRP) *Report 420: Impacts of Access Management Techniques*, driveway density and crash rates show a strong correlation (**Figure 4-17** on the following page).

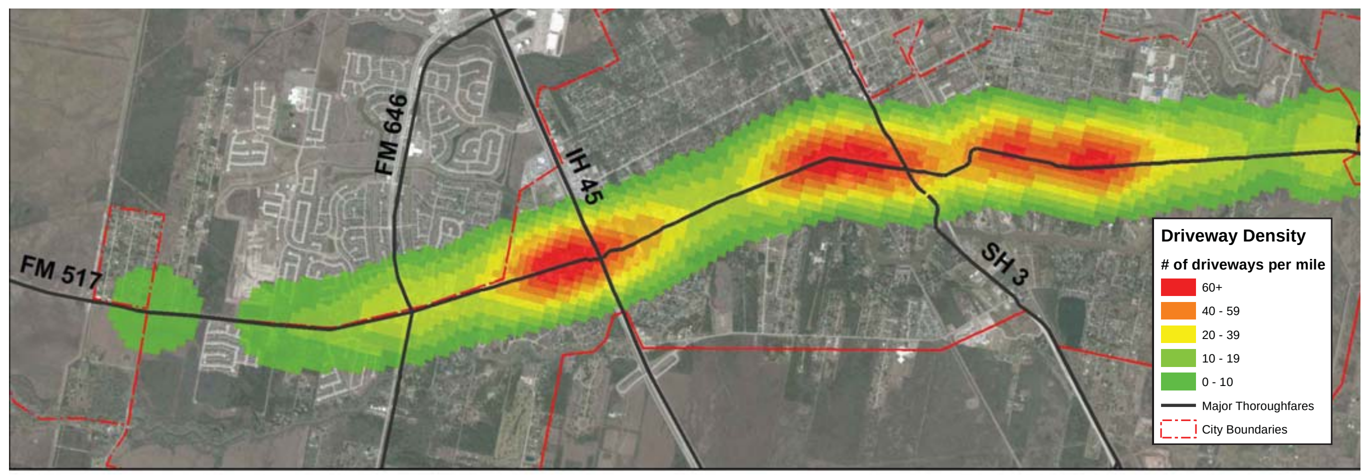


Figure 4-16: Driveway density along the corridor

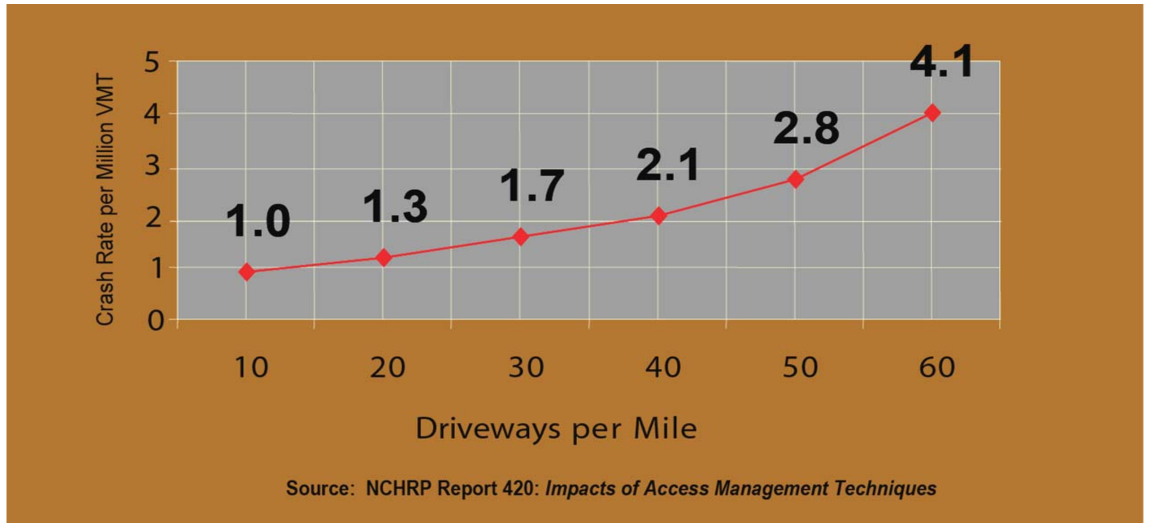


Figure 4-17: Driveway density and crash rates

Following the trend shown in **Figure 4-17**, the highest crash rate along FM 517 is near the IH 45 interchange.

Land Use

FM 517 Corridor – The FM 517 corridor is developed with predominantly commercial frontage but is also the main access point for numerous individual single-family subdivisions, especially west of IH 45.

- *Cemetery Road to FM 646* — Zoned as general and neighborhood commercial and conventional and rural residential areas. Mostly undeveloped with a few commercial, multi-family and single-family tracts.
- *FM 646 to IH 45* — Zoned as general and neighborhood commercial. Mostly commercial with single access points to single-family tracts.
- IH 45 to Timber Drive — Zoned as general and neighborhood commercial and conventional residential areas that include a mixture of commercial and single-family tracts.
- *Timber Drive to SH 3* — Zoned as general commercial frontage with predominately commercial areas.
- *SH 3 to Dickinson Avenue* — Zoned as general commercial frontage with predominately commercial areas.
- *Dickinson Avenue to Baker Drive* — Zoned as general and neighborhood commercial frontage on the north side and conventional residential on the south side that include a mixture of commercial and single-family tracts.
- *Baker Drive to Gum Bayou* — Zoned as general and neighborhood commercial and conventional residential frontage. It is mostly undeveloped, with a few commercial, multi-family and access entries to single-family subdivisions.

FM 517 Land Use Map

Land Use Policy

Dickinson

Land Use Policies, City of Dickinson — The Land Use Policies provide the goals and visions of the City in regards to land use. These goals are as follows:

- Achieve a balanced and desirable pattern of land uses within the City;
- Meet the housing needs of Dickinson residents by developing and maintaining safe, attractive and high-quality neighborhoods;
- Encourage viable, vibrant and well-designed commercial areas with a variety of uses to serve community-wide as well as more localized needs; and
- Focus industrial development in selected areas with adequate utilities and transportation access and set apart from any existing or future residential neighborhoods or other incompatible land uses.

(source: http://www.ci.dickinson.tx.us/community_development_planning_zoning.htm)

Zoning and Subdivision Ordinances, City of Dickinson — The City's zoning ordinance improves its ability to predict and manage the development and use of land in the community. The City intends to establish a framework in which land development and redevelopment practices will contribute to an economically vital, environmentally aware and more livable community.
(source: http://www.ci.dickinson.tx.us/community_development_planning_zoning.htm)

Highway 3 Overlay District — The purpose of the Overlay District is to support the creation of an area similar in look and feel to the late 19th and early 20th century historic main streets, capture the essence of historical character and use, and transition the area from a vehicle-oriented environment to a pedestrian-oriented environment to create a safe and walkable community. The overlay district regulates setbacks, pedestrian circulation, parking requirements, wayfinding, landscaping, architectural design standards, and driveway access. (source: http://www.ci.dickinson.tx.us.html)

League City

Comprehensive Plan 2035, City of League City — The Comprehensive Plan 2035 identifies planned future land use so the City can accommodate projected growth and redevelopment.

Economic Development Policy

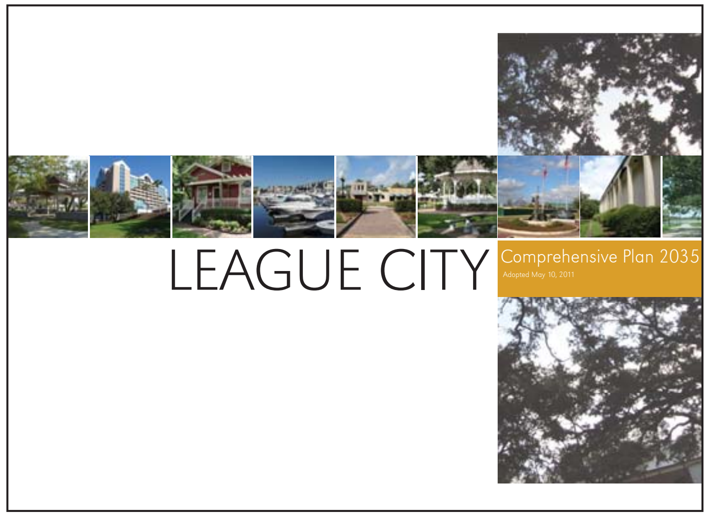
Dickinson

The Dickinson Façade Incentive Program is an addition to the Dickinson Overlay District. It is administered by the Dickinson Economic Development Corporation (DEDC) and provides reimbursements through matching funds to enhance building designs in Dickinson’s Highway 3 Overlay District. The matching fund sources are primarily generated through sales tax revenue that is allocated from the DEDC. The budget allocates $35,000 annually to the Façade Incentive Program.

The goal of the program is to provide incentives to businesses and commercial property owners with properties located within the Highway 3 Overlay District to make improvements to building exteriors and bring the building into compliance with the design standards of the Overlay District. The design standards were written to support the creation of an area similar in look and feel to the late 19th and early 20th century historic main streets. (source: http://www.dickinsontxedc.com/economic_incentives.html)

League City

League City Local Incentives (source: http://www.leaguecity.com/index.aspx?NID=1970)



City Financed Infrastructure Improvements — The City may opt to assist or finance all or a portion of the infrastructure that may benefit a development project when the City leadership team and City Council determine it to be in the long term interest of the city, particularly in a manner that exceeds the needs of the applicant.

Empowerment Zone — Qualified businesses located in the zone are eligible for municipal grants to assist in extending public utilities. The business must invest $250,000 in improvements to be eligible for municipal grants.

Freeport Property Tax Exemption — The Freeport Exemption exempts personal property consisting of inventory goods or ores, other than oil, natural gas, and petroleum. Eligible property must be transported out of the state within 175 days of acquisition, but may first be assembled, stored, manufactured, processed, or fabricated locally.

Industrial Revenue Bonds — Tax Exempt Industrial Revenue Bonds are designed to provide tax-exempt financing for land and depreciable property on eligible industrial or manufacturing projects. The maximum bond amount is $20 million (which can include certain capital and administrative costs). These bonds must receive a reservation under the state's volume limitation (volume cap) managed by the Texas Bond Review Board. The City of League City Economic Development Department may elect to assist qualifying projects through this process, which saves expense to the company through lower interest rates.

Municipal Development Districts — These districts are financed through an additional sales tax approved by the city’s voters. The district has the capacity to utilize funding for economic development projects from type A and type B funding.

Municipal Grants and/or Loans (380 Agreement) — The City Council of the City of League City may provide loans and grants of city funds as well as city employees and equipment to promote economic development projects within the city. Eligible projects involving significant investment may contract with the City to receive sales tax grants, franchise fee grants, water or sewer line extensions, building permit fee waivers and grants for capital recovery fees.

Municipal Management Districts — Municipal Management Districts allow commercial property owners to enhance a defined business area by financing facilities, infrastructure and services beyond those already provided by the municipality. The improvements may be paid for by a combination of self-imposed property taxes, special assessments and impact fees, or by other charges against property owners within the district.

Public Improvement Districts — A Public Improvement District (PID) enables a commercial area to make improvements benefiting the area and spread the cost equally among all properties. The City can levy and collect special assessments on property owners within the PID. These assessments may be used to pay the debt service on bonds or they may be used to pay for services directly if no bonds are issued. PID funds may be used to purchase real property in connection with improvements. Improvements include a wide variety of enhancements such as water and wastewater, streets, drainage, parking, landscaping, etc.

Tax Abatements — A project may be eligible for tax abatement if it is a business or manufacturing facility, research facility, distribution center, regional service facility, basic industry, or other facility "deemed essential to the City's growth." A project may be eligible for abatement of taxes up to 100% and for as long as ten years, depending upon the amount of expenditure and/or the number of employees. Reinvestment in an existing project or expansion of existing facilities may also be eligible for tax abatement.

Tax Increment Reinvestment Zone — Developers of business property within a defined area (i.e., business parks, service centers) may receive municipal financing assistance through the use of tax increment financing. The City Council may create a Tax Increment Reinvestment Zone (TIRZ) where construction of public improvements using tax increment funds is likely to result in significant commercial investment. The cost of improvements within the zone is repaid by the contribution of future tax revenues by each taxing unit that levies taxes on the affected properties. Once the city initiates tax increment financing, counties and school districts may also participate in the tax increment financing program.

Transportation Policy

Dickinson

Street Prioritization Program — The City of Dickinson maintains a comprehensive Street Prioritization Program that helps in determining improvements needs that are essential to be included in the Capital Improvement Program (CIP). The CIP and the Street Prioritization Programs helps identify roadway needs in the City and to improve roadway connectivity and pavement quality.

The City of Dickinson currently does not have either a thoroughfare plan or a bicycle master plan. These two policy documents can help to improve traffic conditions and connectivity in the City not only for vehicle traffic but also for bicycle users as well.

League City

League City Master Mobility Plan (2011) — This is a multi-modal plan that not only examines the roadway network, but also the pedestrian network, bicycle lanes, shared-use paths (i.e., hike & bike trails), commuter rail, regional bus transit (park & ride), local bus transit, and marine transportation. This plan summarizes the multi-modal recommendations including year proposed and estimated cost to maintain League City's street network at a level of service (LOS) D.

Trails Master Plan (2010) — Trails Master Plan will expand the current trails system from 11.5 to 212 miles and include a paddle trail along Clear Creek. The Master Plan was developed based on four principles:

- Promoting connections to schools, parks, neighborhoods, and business centers;
- Providing an alternative way to commute and reach destinations;
- Creating healthy recreation and exercise opportunities; and
- Providing for athletic training.

H-GAC

H-GAC Regional Bike Paths — Sidewalk and trail design should adapt to the surrounding environment, types of users, intensities of uses, and availability of land. The region benefits from a wide variety of pedestrian pathways that accommodate different functions: work commutes, school routes, and recreational activity. Each pathway should be designed to intersect at community nodes, which link pedestrians to employment centers, mixed-use districts, residential neighborhoods, shopping centers, transit stops, and multi-jurisdictional paths.

Minimum design standards for most local sidewalks and trails are under the authority of local development ordinances and/or infrastructure standards. Local standards must meet or exceed the Texas Accessibility Standards and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) when involving places of public accommodation (e.g., parks, restaurants, retail stores, etc.). Other than fulfilling design minimums, the spatial dimension and configuration of each pathway should conform to local needs. Areas with more intense use (e.g., main streets) require wider pedestrian zones and generally benefit from the most public investment.

H-GAC's Pedestrian and Bicyclist Program focuses on the following four planning strategies to improve pedestrian mobility:

- *Regional Corridors* provide continuous travel through multiple jurisdictions, linking municipal, county, and state segments. Because they require continuous right-of-way, these corridors are often found along waterways, greenways, and utility easements. In a system that is only as strong as its weakest link, regional corridor planning identifies gaps in the network. This type of planning may entail new connections from one jurisdiction to another, improving or replacing existing pathway segments, or providing direct access to destinations.
- *Special Districts* are identified in H-GAC's Pedestrian and Bicyclist Special District Study as conducive areas for walking and bicycling based on demographic and physical characteristics. Pedestrian planning within these areas tends to focus on connectivity and beautification at the district scale.
- *Livable Centers* are mixed-use activity centers that are designed for pedestrian convenience. As one-stop destinations, they offer housing, employment, shopping, entertainment, and transit linkages within short walking distance. From conception, these destinations are designed with pedestrian-oriented and -scaled buildings, good separation of people on foot from vehicle circulation and parking, and community gathering spaces.
- *Transportation Improvements* of all types should optimize pedestrian travel, especially roadway construction, widening, and maintenance projects. These design considerations, when addressed in the initial planning stages, help to improve pedestrian safety and enhance the overall functionality of a project in the most cost-effective manner.

Pedestrian and Bicycle Infrastructure

While the west side of the corridor does not provide sufficient pedestrian facilities, pedestrian movement is somewhat accommodated on the east side of the corridor. Beginning at Cemetery Road up to FM 646, the FM 517 corridor lacks sidewalks. Then the sidewalks appear in short, discontinuous segments until SH 3, where they gradually become continuous throughout the rest of the corridor. Facilities accommodating bicyclists are currently unavailable for the corridor. In an effort to increase availability of multi-modal facilities, H-GAC maintains a Pedestrian/Bikeway Regional Plan, which can be viewed at http://www.h-gac.com/go/bikewayviewer. **Figure 4-18** below shows existing and proposed shared used paths and bike paths. These proposed bikeway paths provide a better bike and pedestrian connectivity within the region. Currently, the existing bikeways within the region are FM 646 from IH 45 to FM 517, Calder Drive from FM 518 to CenterPointe Drive, Walker Street from SH 3 to Texas Avenue, Deke Slayton Highway (FM 518) from South Shore Harbour Boulevard to SH 146, Austin Street from Louisiana Avenue to South Shore Harbour Boulevard and along a drainage ditch behind Clear Falls High School to Las Palmas Drive.

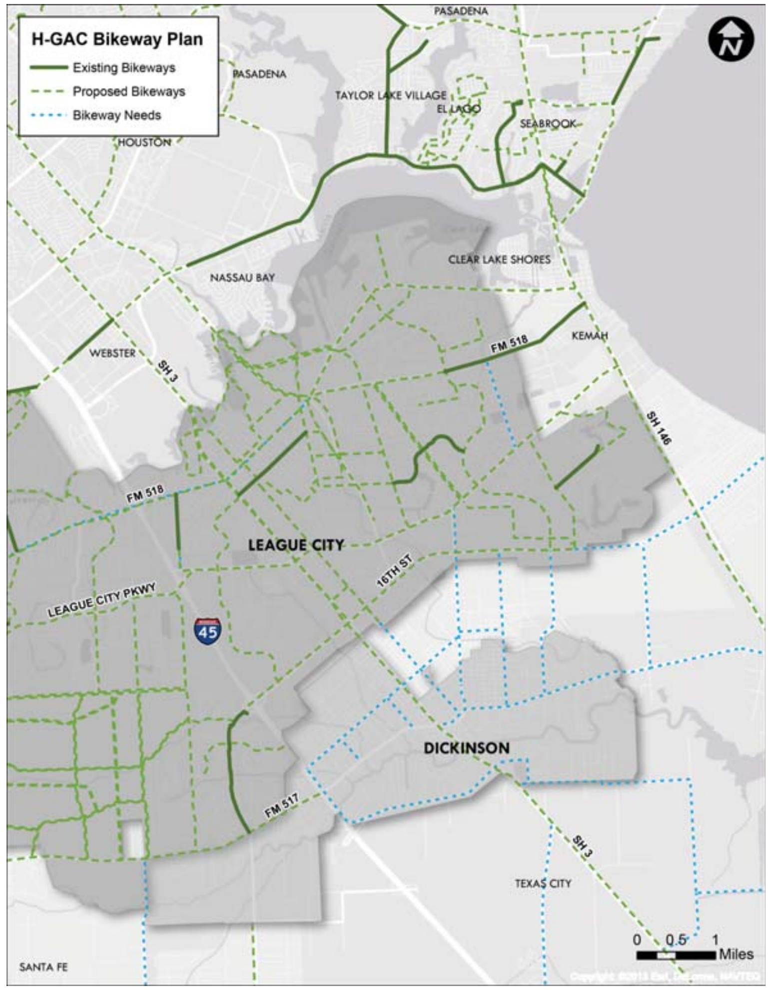


Figure 4-18: Existing and proposed bikeway paths

4.3 CURRENT CORRIDOR CONDITIONS

Level of service (LOS) is an estimate of the amount of congestion that an intersection or section of roadway experiences and serves as a measure of how well traffic moves. LOS ranges from level A, where vehicles travel freely along the corridor, to level F, where vehicles suffer heavy congestion and delay. The segment and intersection LOS was calculated for the FM 517 corridor.

Segment Level of Service

The LOS for a segment depends on many factors that affect traffic along the corridor. Certain roadway characteristics such as signal green times, percentage of heavy vehicles, left turns, directional factors, and others contribute to the calculation of the capacity of a section. Segment capacity, which for an urban arterial such as FM 517 is 7,500 vehicles per lane per day, is used to then calculate the volume-to-capacity ratio. Based on certain thresholds of the volume-to-capacity ratio and travel speed, the LOS of the segment can be determined. A segment with an LOS of D was determined to be acceptable for FM 517, while segments with an LOS E or F are considered excessively congested. **Table 4-3**, summarizes the segment LOS for the study corridor.

Table 4-3: 2013 Corridor Level of Service

Section	Arterial LOS	
	EB	WB
Cemetery to FM 646	A	A
FM 646 to Fire Station 2	A	C
Fire Station 2 to IH 45 SBFR	D	A
IH 45 SBFR to IH 45 NBFR	F	F
IH 45 NBFR to Maple Drive	B	C
Maple Drive to 44th Street	B	B
44th to SH 3	E	C
SH 3 to Dickinson Avenue	C	F
Dickinson Avenue to California Avenue	A	C
California Avenue to Owens Drive	B	B

Intersection Level of Service

The Highway Capacity Manual presents the methodology for calculation of intersection delay (based on the average delay) for all approaches, and then associates the appropriate LOS to the approach and intersection. The methodology considers intersection lane configuration, speed limits, volumes, traffic signal timing characteristics, and other criteria. Synchro™ software, which incorporates the HCM methodology, was used to determine LOS for the FM 517 intersections during the AM and PM peak time periods. **Figure 4-19** summarizes LOS for all signalized intersection and corridor segments. The existing operations are at an acceptable LOS during the peak periods. However, some intersections are near the threshold of needing improvements and are expected to deteriorate to an unacceptable level in the future. In evaluating intersection operations, the study team analyzed the overall average delay as well as individual approach movements. **Table 4-4** on the following page provides the LOS and describes the deficient traffic movement at each intersection.

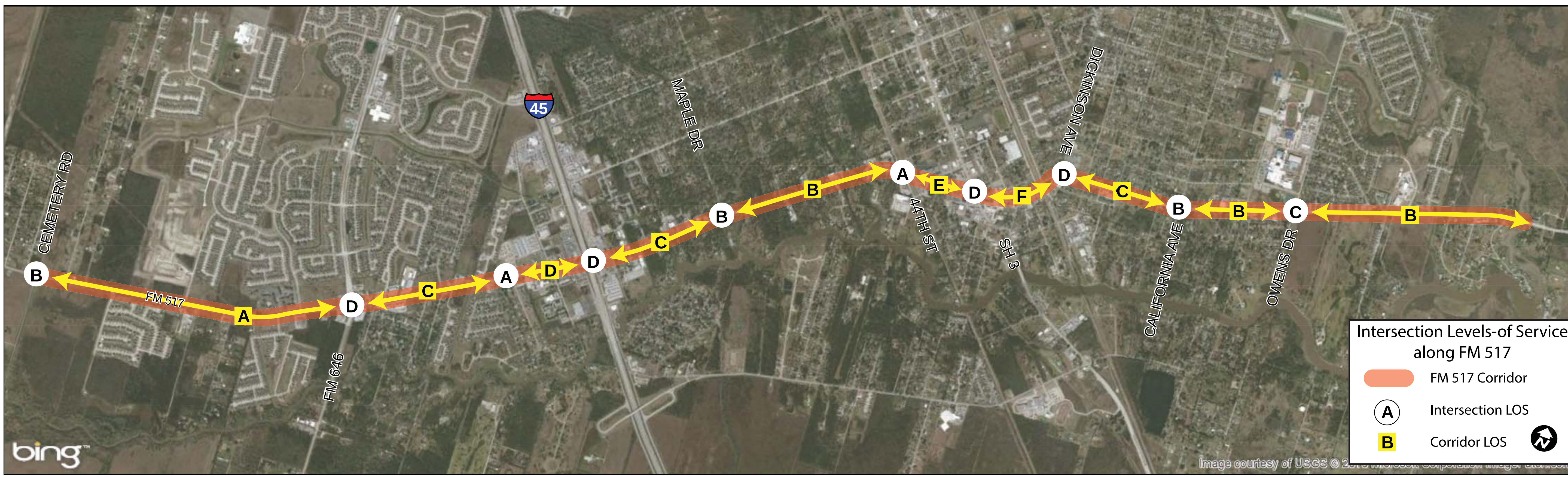


Figure 4-19: LOS for all signalized intersection and corridor segments

Table 4.4 – Existing Intersection Operational Analysis							
Intersection	**Approach**	**Deficient Movement**	**Approach Existing LOS AM**	**Approach Existing LOS PM**	**Intersection Existing LOS AM**	**Intersection Existing LOS PM**	**Comments**
FM 517 at Cemetery Rd.	NB		C	C	B	B	Minor street volume low. No geometric improvements needed.
	EB		B	C			
	SB		-	A			
	WB		A	B			
FM 517 at Shoreview Dr.	NB		-	-	-	-	Stop controlled
	EB		-	-			
	SB		-	-			
	WB		-	-			
FM 517 at FM 646	NB		D	D	D	D	Heavy westbound right turn volumes accommodated by shared thru/right turn lanes.
	EB		D	D			
	SB		D	D			
	WB	WB Thru	D	D			
FM 517 at Fire Station 2	NB		-	-	A	A	Emergency signal
	EB		A	A			
	SB		B	A			
	WB		A	A			
FM 517 at IH 45 NBFR	NB		E	D	C	D	
	EB		A	D			
	SB		-	-			
	WB		D	D			
FM 517 at IH 45 SBFR	NB		-	-	D	C	Heavy Eastbound thru volumes accommodated by shared thru/right turn lanes. Heavy southbound left turns.
	EB	EB Thru	E	C			
	SB	SB Left	E	D			
	WB		A	C			
FM 517 at Maple Dr.	NB		A	C	A	B	Minor street volume low. No geometric improvements needed.
	EB		A	B			
	SB		B	C			
	WB		A	B			

Table 4.4 – Existing Intersection Operational Analysis (Cont.)							
Intersection	Approach	Deficient Movement	Approach Existing LOS AM	Approach Existing LOS PM	Intersection Existing LOS AM	Intersection Existing LOS PM	Comments
FM 517 at 44th St.	NB		B	C	A	A	Minor street volume low. No geometric improvements needed.
	EB		A	A			
	SB		C	C			
	WB		A	A			
FM 517 at SH 3	NB		D	D	D	C	Operates at LOS D through 2025.
	EB		D	C			
	SB		D	D			
	WB		C	C			
FM 517 at Dickinson Ave	NB	NB Left	C	C	D	B	Heavy southbound right turn volumes. Need an additional exclusive right turn lane.
	EB		B	B			
	SB	SB Right	F	C			
	WB	WB Thru	C	C			
FM 517 at Texas Ave	NB		-	-	-	-	Stop controlled
	EB		-	-			
	SB		-	-			
	WB		-	-			
FM 517 at California Ave	NB		C	C	B	A	Minor street volume low. No geometric improvements needed.
	EB		B	A			
	SB		C	C			
	WB		B	A			
FM 517 at Baker Dr.	NB		-	-	-	-	Stop controlled
	EB		-	-			
	SB		-	-			
	WB		-	-			
FM 517 at Owens Dr.	NB		D	C	C	B	Minor street volume low. No geometric improvements needed.
	EB		B	B			
	SB		C	C			
	WB		C	B			

Chapter 5

Existing Conditions – SH 3

5.1 EXISTING TRAFFIC CHARACTERISTICS

Daily Traffic Volumes

Average annual daily traffic (AADT) counts were provided by TxDOT for each of the sections along the corridor. These daily traffic volume counts are shown in **Table 5-1** below.

Table 5-1: 2011 Daily Traffic Volumes

SH 3	AADT
Hughes Road to FM 517	12,800
FM 517 to FM 646	12,100
FM 646 to League City Parkway	9,600
League City Parkway to FM 518/Main Street	14,380

The speed limits of the project vary based on the priorities of each section of SH 3. For this corridor, the limits are in the more urban areas of Dickinson and League City, where access point density is high and therefore, speed limits are somewhat lower. In the middle of the corridor ranging from Hughes Road to 20th Street, there are some residential and commercial areas with a speed limit of 40 mph. The section north of 20th Street is more rural with fewer businesses and only a few major intersections and the speed limit to Walker Street is higher. **Table 5-2** below is a summary of the existing speed limits for each of the sections on SH 3.

Table 5-2: Corridor Speed Limits

SH 3	Northbound	Southbound
Hughes Road to 20th Street	40 MPH	40 MPH
20th Street to FM 646	40 MPH	50 MPH
FM 646 to Walker Street	50 MPH	50 MPH
Walker Street to FM 518	40 MPH	40 MPH

Crash Analysis

TxDOT provided crash data for the SH 3 corridor for 2007 through 2011. The study team analyzed the crash data based on location, severity and type. Of the 368 total crashes along the corridor, 257 (almost 70%) did not result in an injury, and only one fatal crash occurred in the five years of crash data. **Figure 5-1** shows the breakdown of crash types ranging from non-injured to fatal. Average annual daily traffic volumes (provided by TxDOT) were used to estimate vehicle miles traveled (VMT). These values were then used to calculate the crash rates for sections of the SH 3 corridor. **Figure 5-2** (on the following page) shows that crash rates for all four sections of the SH 3 corridor are well above the state average for a similar type of farm to market road. In fact, the average crash rate for the SH 3 corridor is 78% higher than the statewide average. Considering this unusually high crash rate, it would be beneficial for the roadway users if efforts were focused on increasing the general safety of this corridor.

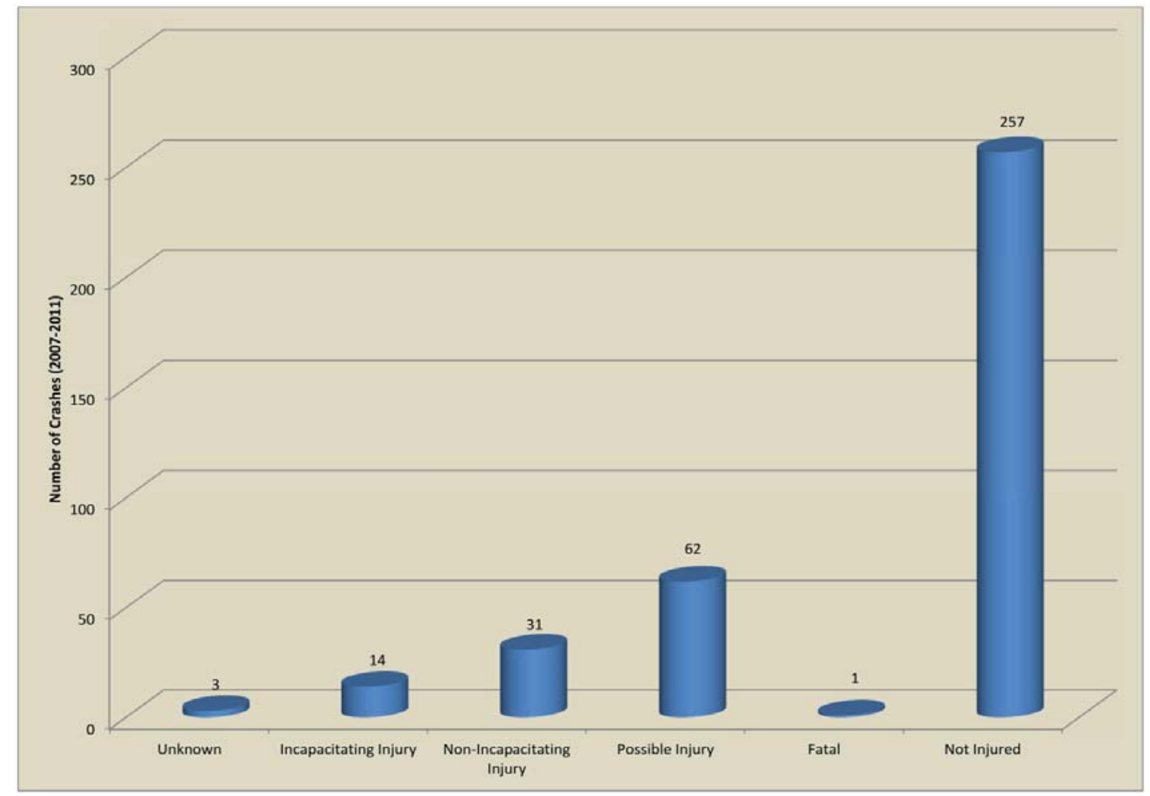


Figure 5-1: SH 3 Crash type

The highest crash rate occurs in the section from SH 96 (League City Parkway) to FM 518 (Main Street). This area has many aspects that are contributing factors to the crashes occurring in the section. On each of the four corners of the FM 518 and SH 3 intersection, there are major businesses including a gas station, a fast food restaurant, a coffee shop, and a drug and pharmacy store, each having two to four driveways that access both FM 518 and SH 3. All of these businesses attract many trips per day, coming from all four directions. Many of these vehicles are using the two-way left turn lane to turn left into driveways that are within close proximity to other driveways as well as the intersection at FM 518. These movements are a major contributing factor to congestion and an above average crash rate for this section of roadway.

The driveway and intersection density between Wilkins Street and Deats Road is lower than the density around the intersection of SH 3 and FM 518. There are also fewer major businesses along this section of road, and the speed limits are higher. The two locations along this section of SH 3 with high crash rates are at the intersections of SH 3 at FM 646 and SH 3 at League City Parkway. TxDOT currently has both of these intersections planned to be grade separated in the future.

The intersection of SH 3 and FM 517 has many driveways and side street access points around the intersection. The properties on the corners of these intersections include a gas station, a church, Dickinson City Hall, and a bank, all attracting many trips.

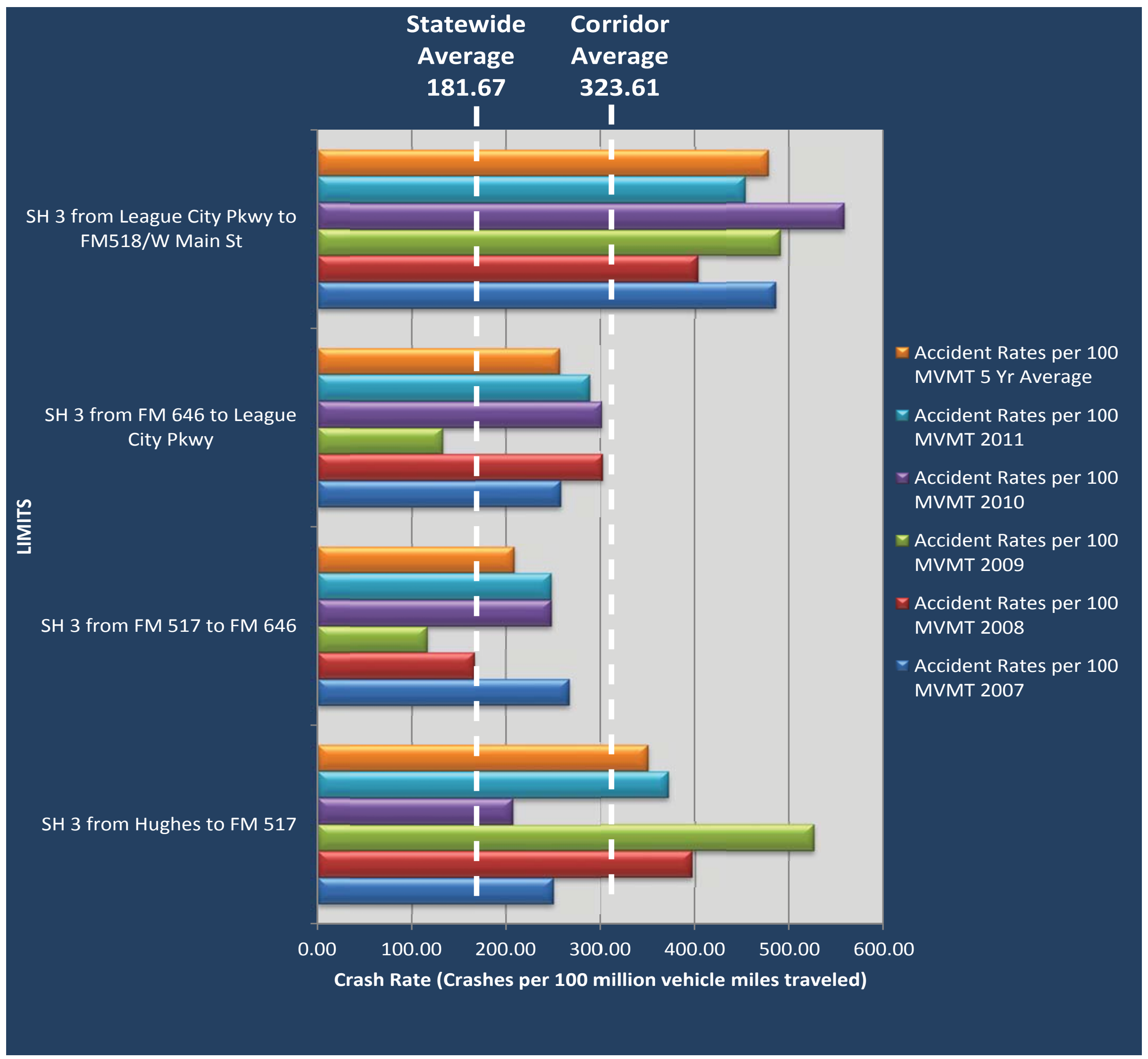


Figure 5-2: Crash rates from 2007-2011

The type of collision was analyzed and is described in **Figure 5-3**. While it is difficult to always determine reasons for collisions, certain patterns often become apparent. The SH 3 analysis revealed that 32% of the crashes were a result of left turning and rear end collisions, which are typically attributable to corridors with a high number of driveways and continuous two-way left-turn lanes.

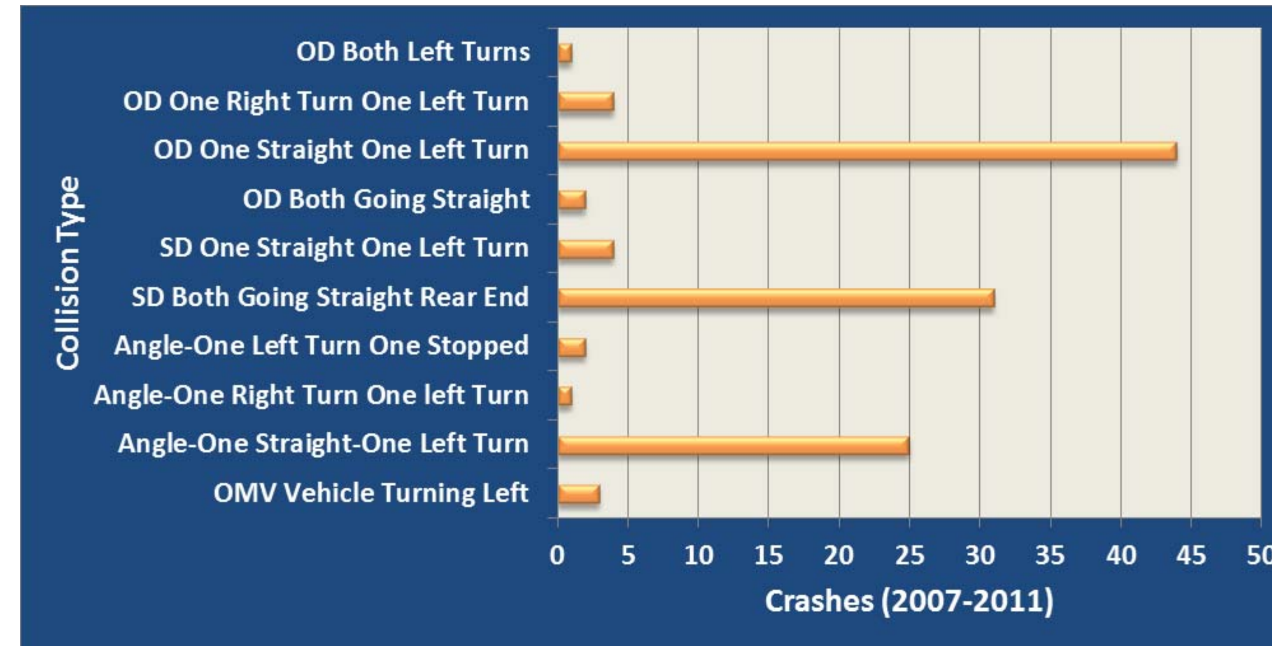


Figure 5-3: Collision types for 2007-2011

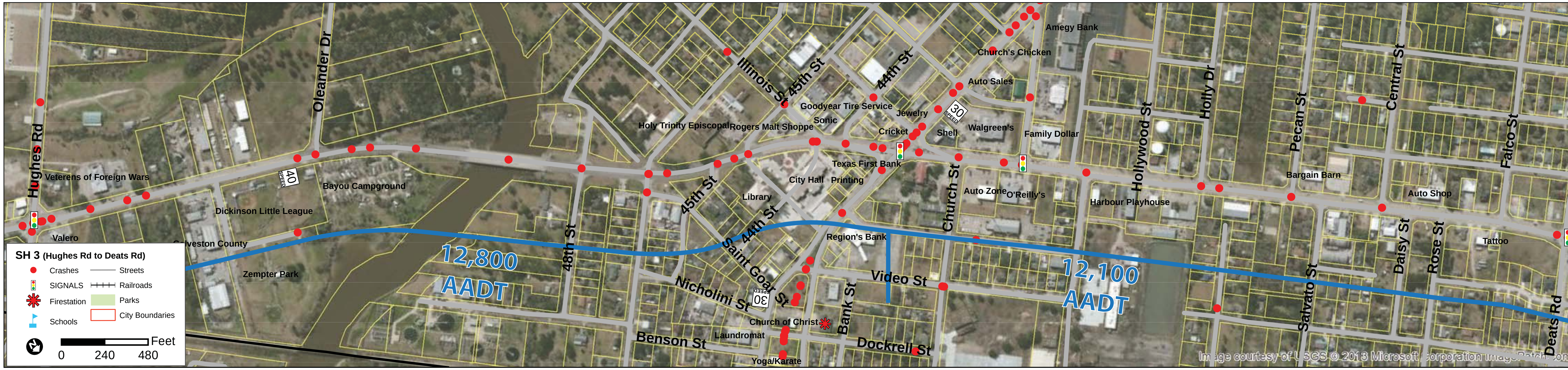


Figure 5-4: Existing Conditions from Hughes Road to Deats Road

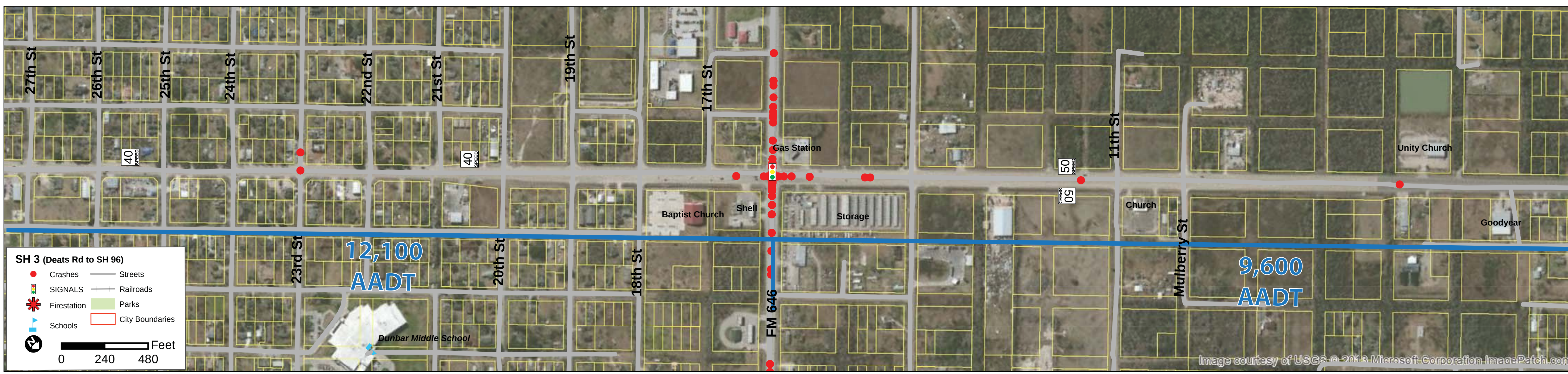


Figure 5-5: Existing Conditions from Deats Road to SH 96

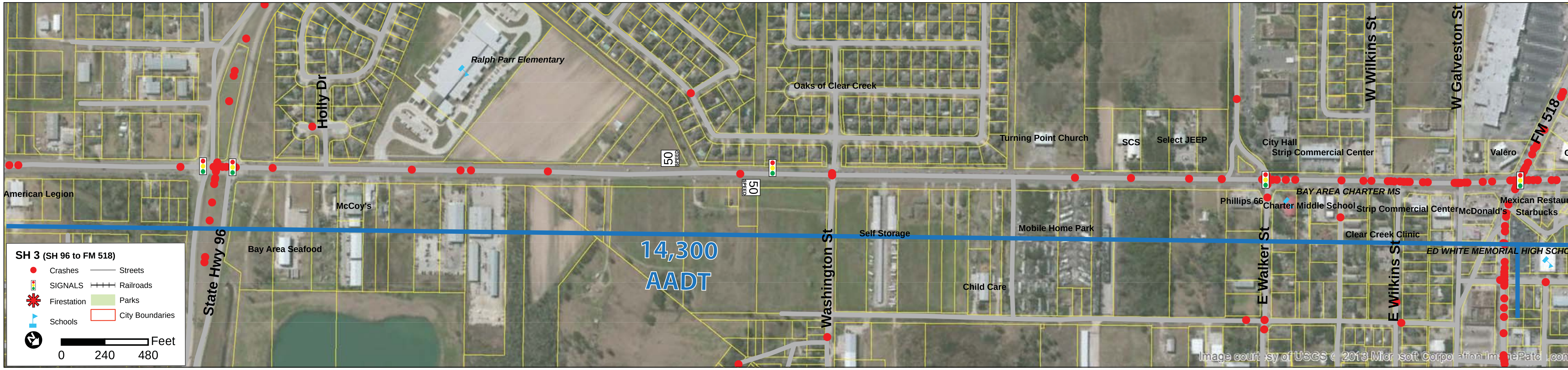


Figure 5-6: Existing Conditions from SH 96 to FM 518

5.2 ROADWAY AND ACCESS INVENTORY

Roadway Cross-Section

Beginning from the south limit of the SH 3 corridor at Hughes Road, the roadway has two 12-foot lanes in each direction, with a 14-foot two-way left turn lane, and curb and gutter on both sides (**Figure 5-7**). The only existing sidewalks are in front of the Dickinson City Hall and the Dickinson Public Library on the east side of SH 3. This roadway configuration fits within a ROW width of 90 feet. Continuous sidewalks are provided after the FM 517 intersection on both sides of SH 3 with a ROW of 90 feet (**Figure 5-8**). The ROW expands to 150 feet at 20th Street and a 10-foot shoulder begins on both sides of SH 3 (**Figure 5-9** and **Figure 5-10**). This configuration continues until a little over a quarter mile south of SH 96, where the shoulders drop to approximately 3 feet or less in some areas. Also, just south of West Independence Avenue, the ROW narrows to 95 feet, but retains the same roadway geometry (**Figure 5-11**).

Curb-and-gutter are provided less than a quarter mile south of Walker Street. Sidewalks are provided on the east side of SH 3 from Walker Street to FM 518 (**Figure 5-12**), but are only partially available on the west side of SH 3. The configuration of two 12-foot lanes in each direction with one two-way left turn lane changes to three 12-foot lanes in each direction, with a two-way left turn lane starting at East Wilkins Street through the northern corridor limit at FM 518. The ROW north of Walker Street varies from 95 feet to approximately 105 feet near the FM 518 intersection.

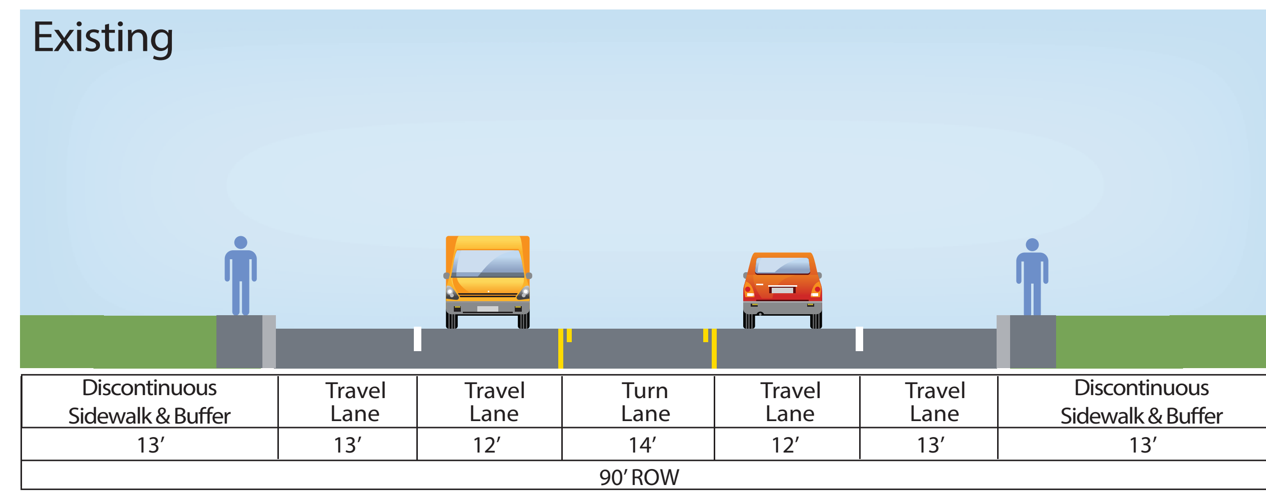


Figure 5-7: SH 3 - Hughes Road to Deats Road

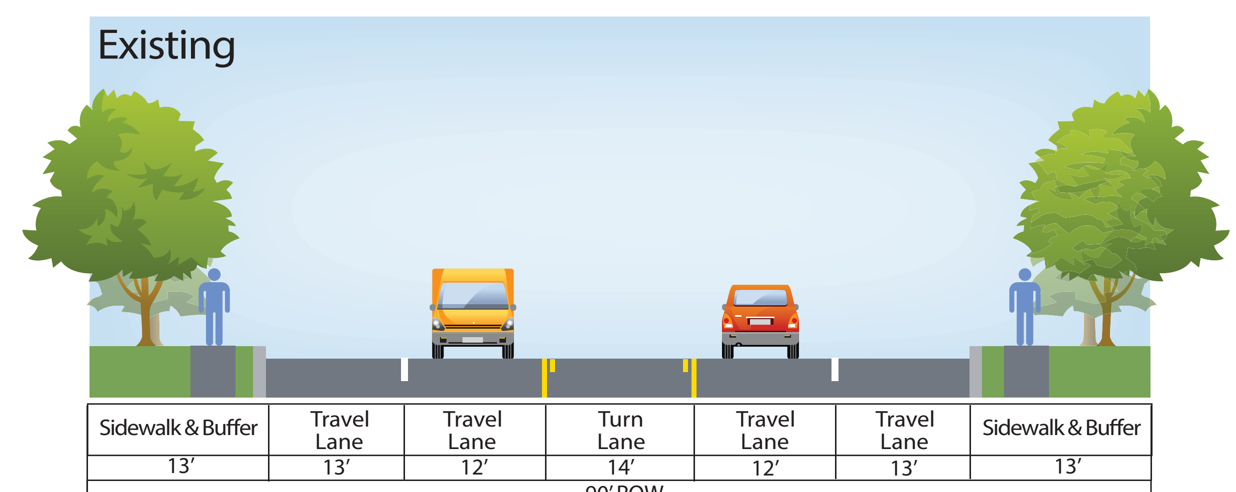
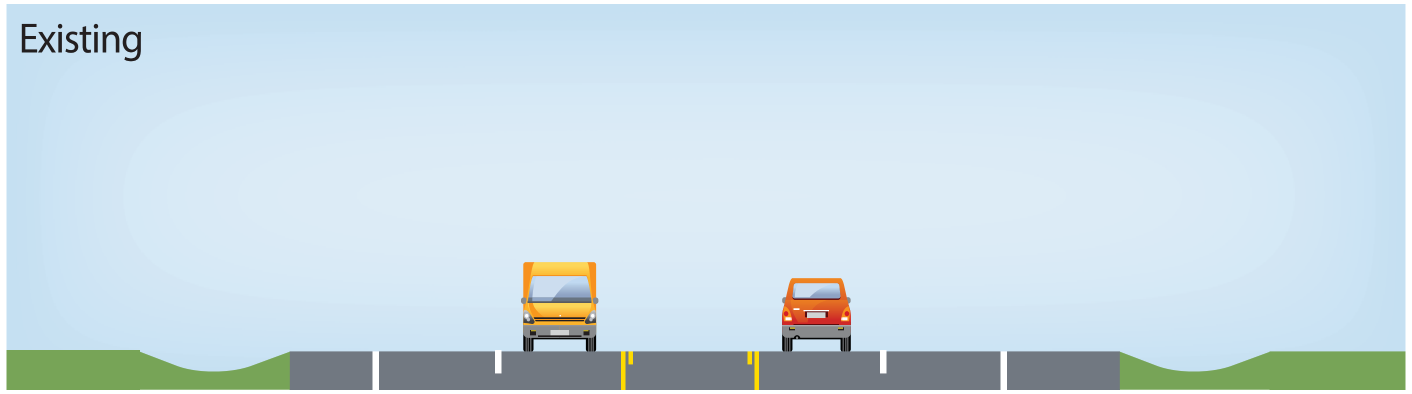
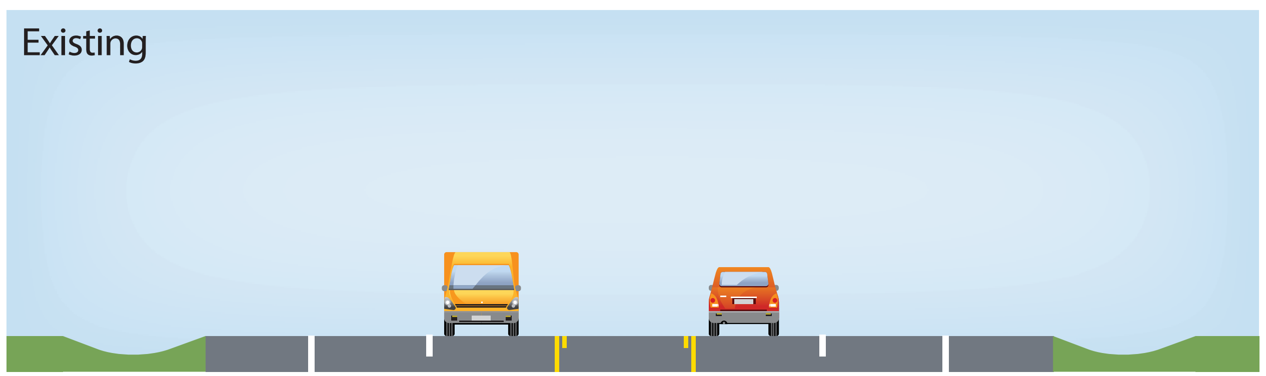


Figure 5-8: SH 3 - Deats Road to 20th Street



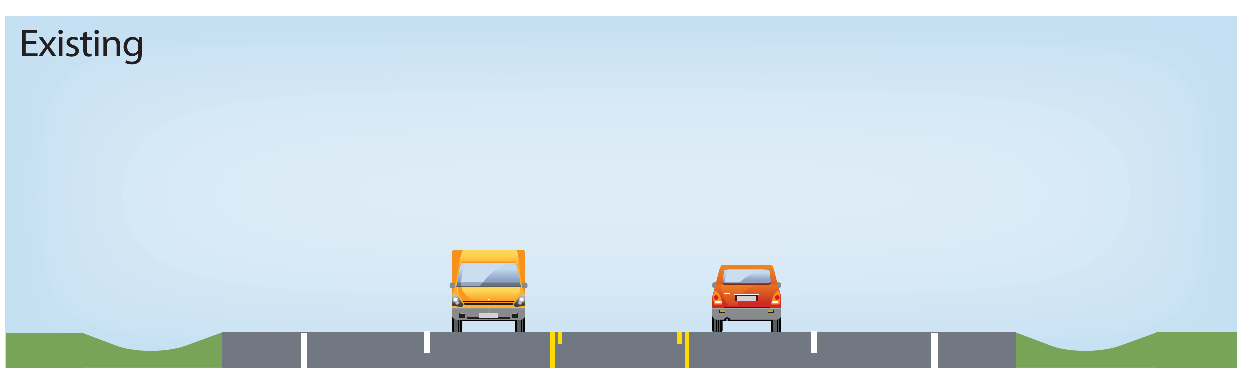
Buffer with Drainage Swale	Shoulder	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Shoulder	Buffer with Drainage Swale
32'	10'	12'	12'	18'	12'	12'	10'	32'
150' ROW								

Figure 5-9: SH 3 - 20th Street to FM 646



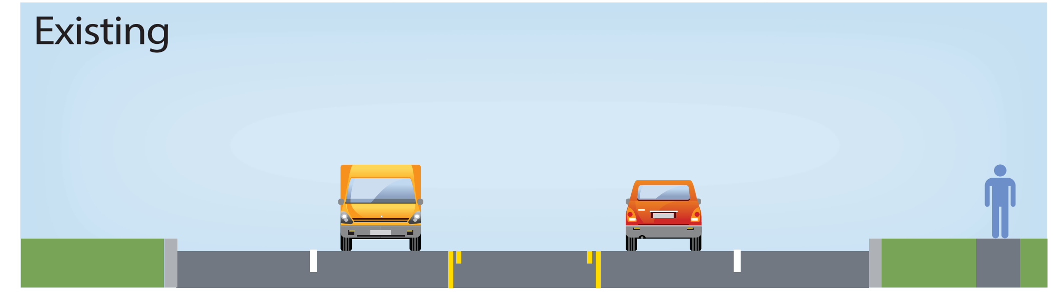
Buffer with Drainage Swale	Shoulder	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Shoulder	Buffer with Drainage Swale
32'	10'	12'	12'	18'	12'	12'	10'	32'
150' ROW								

Figure 5-10: SH 3 - FM 646 to SH 96



Buffer with Drainage Swale	Shoulder	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Shoulder	Buffer with Drainage Swale
Varies	5'	12'	12'	15'	12'	12'	5'	Varies
95' ROW								

Figure 5-11: SH 3 - SH 96 to Walker Street



Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
17'	14'	12'	16'	12'	14'	20'
105' ROW						

Figure 5-12: SH 3 - Walker Street to FM 518

Traffic Signals

TxDOT maintains all signalized intersections within Dickinson City limits (Hughes Road, FM 517, Termini Street, Deats Road and FM 646). League City operates SH 96 (League City Parkway), Walker Street and FM 518. The Walker Street and FM 518 traffic signals operate as a time-based, coordinated system. Time-based coordination relies upon each individual traffic controller clock to maintain proper time in order to coordinate appropriately with other signalized intersections — rather than utilizing a "master traffic signal controller" that maintains the correct time for the entire set of intersections. In other words, the signalized intersections are not linked as part of a corridor communication system. If the internal traffic signal controller clocks become "out of sync" with each other, the coordination between signals worsens. Given the spacing between signalized intersections, communication will not provide significant benefit for signal coordination for the entire corridor. However, coordination for several of the intersections — specifically the four signals within 1.6 miles between Hughes Road and Deats Road — that are more closely spaced could improve traffic operations.

Railroad Crossings

SH 3 is parallel to the Union Pacific Railroad (UPRR) for the length of the corridor. The two travel ways are offset by slightly more than a quarter mile for the majority of the corridor. While there are no railroad crossings on SH 3, the adjacent railroad can indirectly affect the traffic conditions of some intersections. When a train passes the major east/west arterials, it could cause queues to form on those arterials that back up to the intersections with SH 3. Because of its close proximity to SH 3, the railroad was kept in consideration throughout this corridor study.

Transit Operations

Connect Transit (part of the Gulf Coast Center, a special services agency for Galveston and Brazoria Counties) provides a fixed route bus that navigates in the study area (**Figure 5-13**). Also, a transit study is being performed by Goodman Corporation to determine the feasibility of implementing commuter rail between Galveston and Houston serving a number of communities including Dickinson and League City (**Figure 5-14**). The existing rail that runs parallel to SH 3 would be utilized for the new commuter rail. The addition of this new form of public transportation is expected to increase the economic value of the region, support growth, and enhance mobility and connectivity.

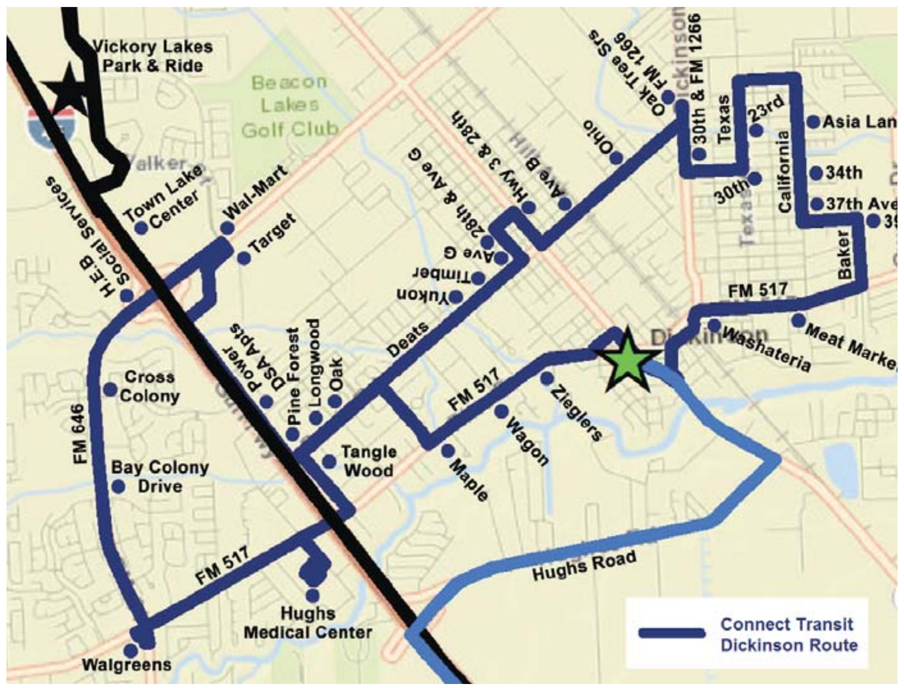


Figure 5-13: Connect Transit-Dickinson Route

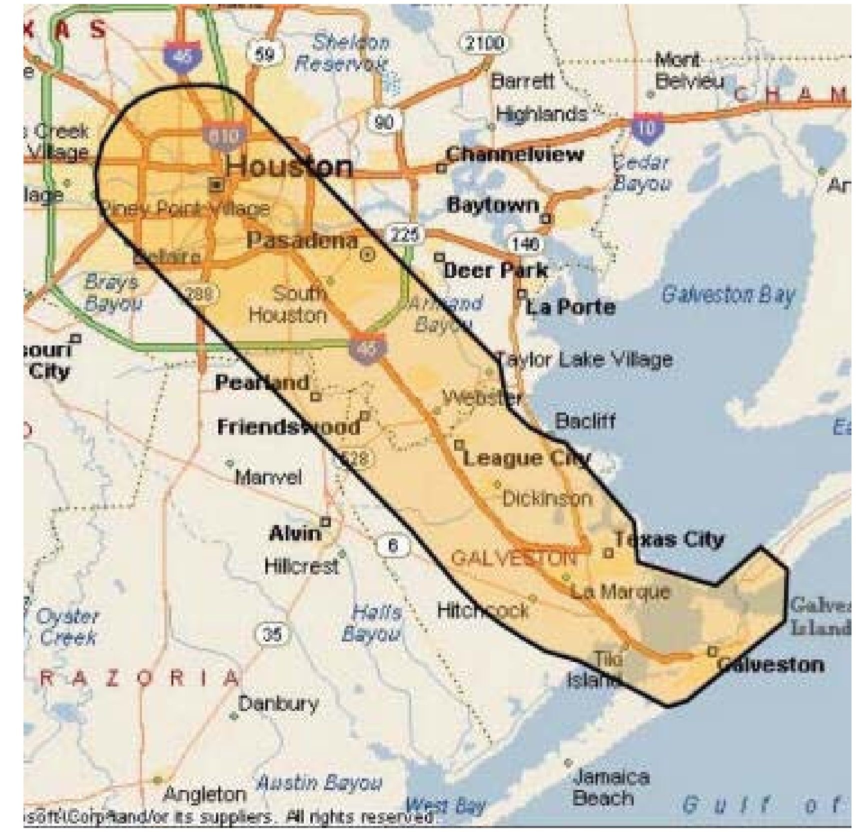


Figure 5-14: Houston-Galveston Commuter Rail Study

Access

The SH 3 corridor has clusters of driveways in close proximity to other driveways and/or intersections, making it difficult in congestion for vehicles to make their desired turning movement at the driveway. **Figure 5-15** below shows the driveway density along the corridor. The highest driveway density is between Walker Street and FM 518.

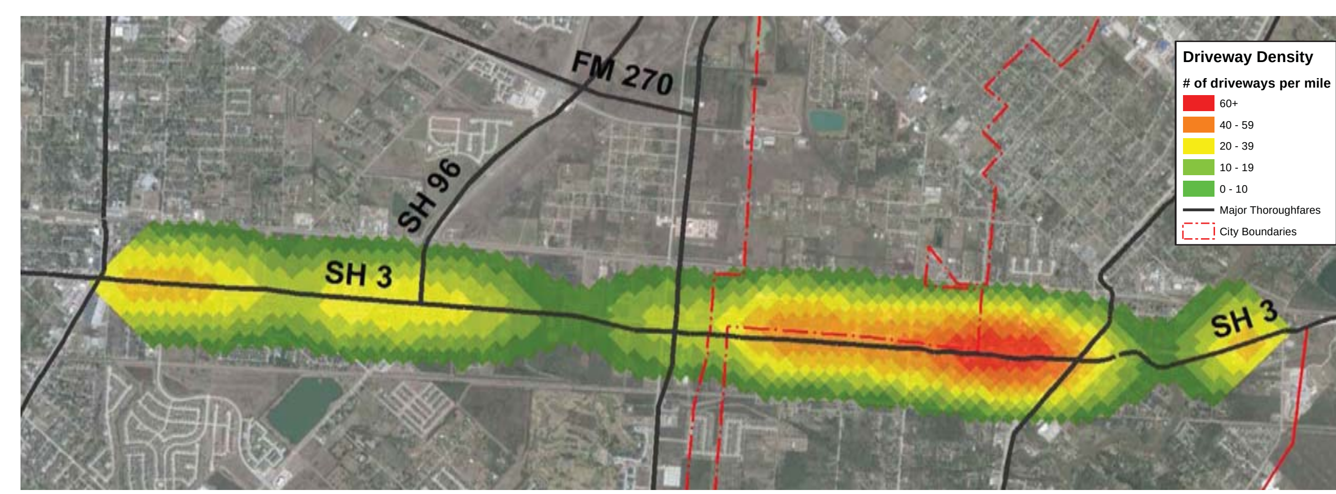


Figure 5-15: Driveway density for SH 3

As mentioned in Chapter 4, according to the National Cooperative Highway Research Program's (NCHRP) *Report 420: Impacts of Access Management Techniques*, driveway density and crash rates show a strong exponential correlation (**Figure 5-16**). The driveway density from Walker Street to FM 518 is approximately 58 driveways per mile. Following the trend shown in **Figure 5-16**, this section has the highest crash rate.

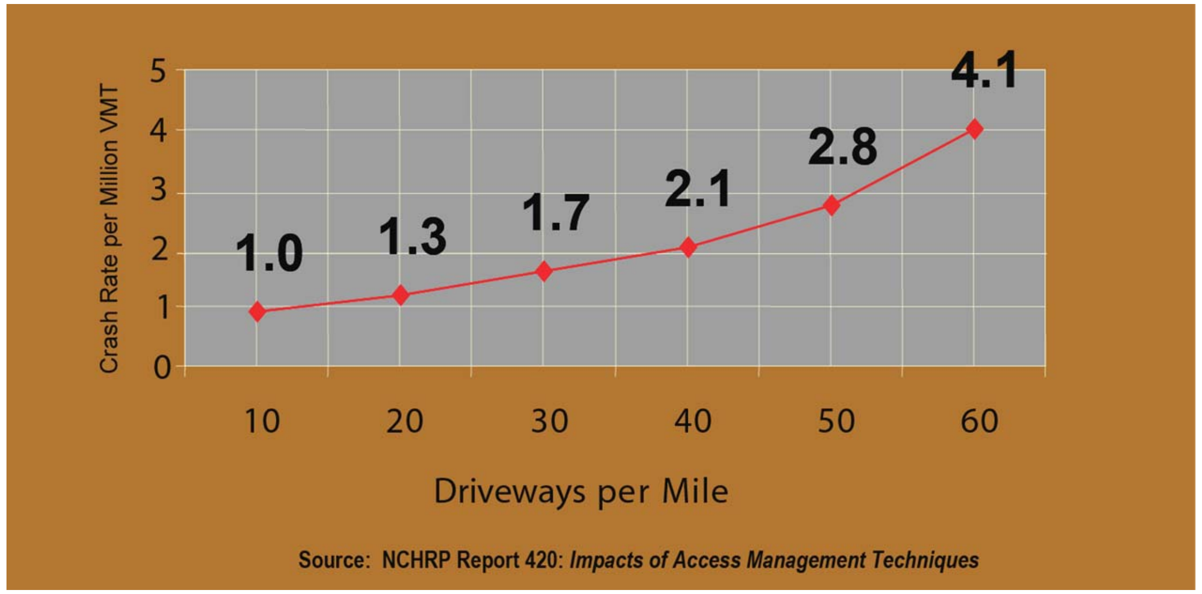
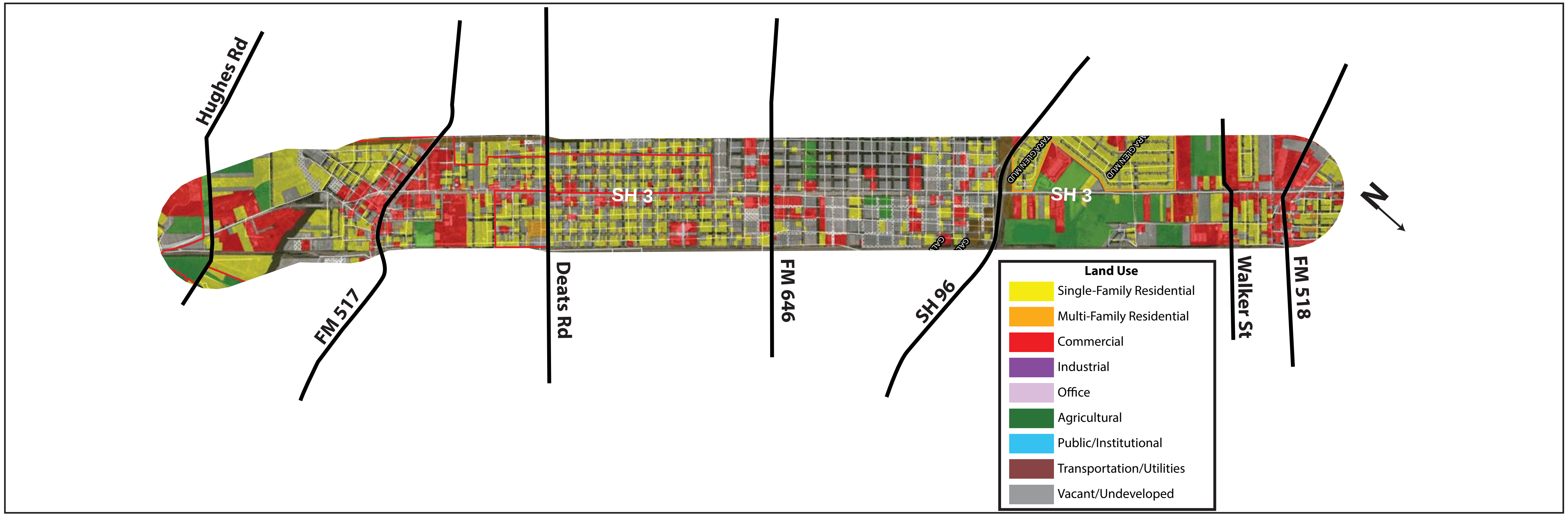


Figure 5-16: Driveway density and crash rates

Land Use

SH 3 Corridor — The SH 3 corridor is developed with predominantly commercial frontage with a lot of vacant land and/or re-development, specifically between Sunset and Walker Street.

- *Hughes Road to Dickinson Bayou* — Zoned general commercial and conventional residential. A mixture of commercial and single-family.
- *Dickinson Bayou to FM 517* — Zoned as general commercial and conventional residential. Predominately commercial.
- *FM 517 to Deats Road* — Zoned as general and neighborhood commercial. Predominately commercial.
- *Deats Road to FM 646* — Zoned as neighborhood commercial on the south side and unzoned on the north side. A mixture of commercial and single-family.
- *FM 646 to League City Parkway (SH 96)* — Zoned for enhanced auto dominant commercial with areas of rural/estate residential. Largely undeveloped at its current state.
- *League City Parkway (SH 96) to Walker Street* — Zoned for enhanced auto dominant commercial with areas of enhanced auto dominant residential. Largely undeveloped with a few commercial tracts.
- *Walker Street to FM 518* — Zoned for enhanced auto dominant commercial. Predominately commercial.



SH 3 Land Use Map

Land Use Policy

Dickinson

Land Use Policies (Dickinson) — The Land Use Policies provide the goals and visions of the City in regards to land use. These goals are as follows:

- Achieve a balanced and desirable pattern of land uses within the City;
- Meet the housing needs of Dickinson residents by developing and maintaining safe, attractive and high-quality neighborhoods;
- Encourage viable, vibrant and well-designed commercial areas with a variety of uses to serve community-wide as well as more localized needs; and
- Focus industrial development in selected areas with adequate utilities and transportation access and set apart from any existing or future residential neighborhoods or other incompatible land uses.

(source: http://www.ci.dickinson.tx.us/community_development_planning_zoning.htm)

Zoning and Subdivision Ordinances (Dickinson) — The City developed a zoning ordinance to improve its ability to regulate and manage the development and use of land in the community. The City intends to establish a framework in which land development and redevelopment practices will contribute to an economically vital, environmentally aware and more livable community. (source: http://www.ci.dickinson.tx.us/community_development_planning_zoning.htm)

Highway 3 Overlay District — The purpose of the Overlay District is to support the creation of an area similar in look and feel to the late 19th and early 20th century historic main streets, capture the essence of historical character and use and transition the area from a vehicle oriented environment to a pedestrian oriented environment creating a safe, walkable community. The overlay district regulates setbacks, pedestrian circulation, parking requirements, wayfinding, landscaping, architectural design standards, driveway access, (source: http://www.ci.dickinson.tx.us.html) (see **Figure 5-17**).

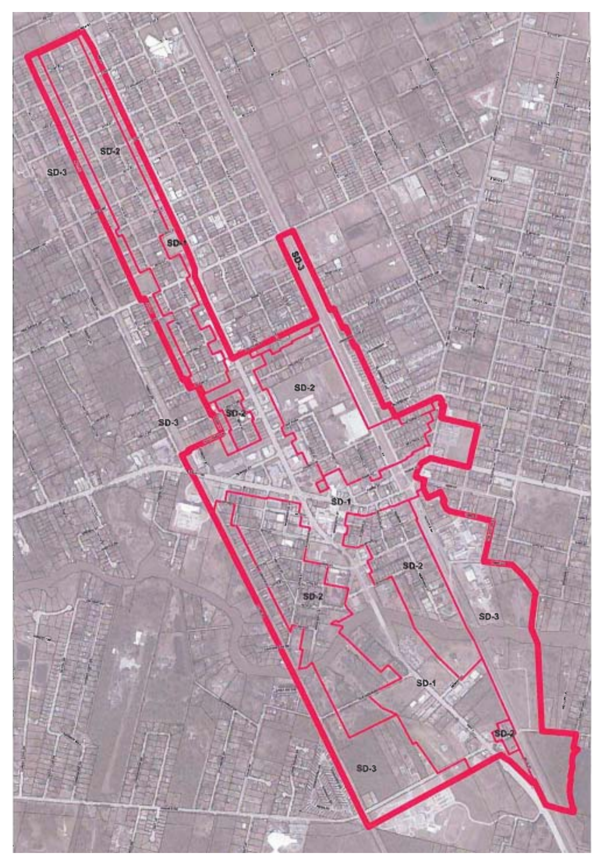


Figure 5-17: SH 3 Overlay District

League City

Comprehensive Plan 2035 (League City) — The Comprehensive Plan 2035 identifies planned future land use so the City can accommodate projected growth and redevelopment.

Economic Development Policy

Dickinson

The Dickinson Façade Incentive Program is an addition to the Dickinson Overlay District. It is administered by the Dickinson Economic Development Corporation (DEDC) and provides reimbursements through matching funds to enhance building designs in Dickinson's Highway 3 Overlay District. The matching fund sources are primarily generated through sales tax revenue that is allocated from the DEDC. The budget allocates $35,000 annually to the Façade Incentive Program.

The goal of the Program is to provide incentives to businesses and commercial property owners with properties located within the Highway 3 Overlay District to make improvements to building exteriors and bring the building into compliance with the design standards of the Overlay District. The design standards were written to support the creation of an area similar in look and feel to the late 19th and early 20th century historic main streets. (source: http://www.dickinsontxedc.com/economic_incentives.html)

League City

League City Local Incentives (source: http://www.leaguecity.com/index.aspx?NID=1970)

City Financed Infrastructure Improvements — The City may opt to assist or finance all or a portion of the infrastructure that may benefit a development project when the City leadership team and City Council determine it to be in the long term interest of the city, particularly in a manner that exceeds the needs of the applicant.

Empowerment Zone — Qualified businesses located in the zone are eligible for municipal grants to assist in extending public utilities. The business must invest $250,000 in improvements to be eligible for municipal grants.

Freeport Property Tax Exemption — The Freeport Exemption exempts personal property consisting of inventory goods or ores, other than oil, natural gas, and petroleum. Eligible property must be transported out of the state within 175 days of acquisition, but may first be assembled, stored, manufactured, processed or fabricated locally.

Industrial Revenue Bonds — Tax Exempt Industrial Revenue Bonds are designed to provide tax-exempt financing for land and depreciable property on eligible industrial or manufacturing projects. The maximum bond amount is $20 million (which can include certain capital and administrative costs). These bonds must receive a reservation under the state's volume limitation (volume cap) managed by the Texas Bond Review Board. The City of League City Economic Development Department may elect to assist qualifying projects through this process, which saves expense to the company through lower interest rates. *Municipal Development Districts* — These districts are financed through an additional sales tax approved by the city's voters. The district has the capacity to utilize funding for economic development projects from type A and type B funding.

Municipal Grants and/or Loans (380 Agreement) — The City Council of the City of League City may provide loans and grants of city funds as well as city employees and equipment to promote economic development projects within the city. Eligible projects involving significant investment may contract with the City to receive sales tax grants, franchise fee grants, water or sewer line extensions, building permit fee waivers and grants for capital recovery fees.

Municipal Management Districts — Municipal Management Districts allow commercial property owners to enhance a defined business area by financing facilities, infrastructure and services beyond those already provided by the municipality. The improvements may be paid for by a combination of self-imposed property taxes, special assessments and impact fees, or by other charges against property owners within the district.

Public Improvement Districts — A Public Improvement District (PID) enables a commercial area to make improvements benefiting the area and spread the cost equally among all properties. The City can levy and collect special assessments on property owners within the PID. These assessments may be used to pay the debt service on bonds or they may be used to pay for services directly if no bonds are issued. PID funds may be used to purchase real property in connection with improvements. Improvements include a wide variety of enhancements such as water and wastewater, streets, drainage, parking, landscaping, etc.

Tax Abatements — A project may be eligible for tax abatement if it is a business or manufacturing facility, research facility, distribution center, regional service facility, basic industry, or other facility "deemed essential to the City's growth." A project may be eligible for abatement of taxes up to 100% and for as long as ten years, depending upon the amount of expenditure and/or the number of employees. Reinvestment in an existing project or expansion of existing facilities may also be eligible for tax abatement.

Tax Increment Reinvestment Zone — Developers of business property within a defined area (i.e., business parks, service centers) may receive municipal financing assistance through the use of tax increment financing. The City Council may create a Tax Increment Reinvestment Zone (TIRZ) where construction of public improvements using tax increment funds is likely to result in significant commercial investment. The cost of improvements within the zone is repaid by the contribution of future tax revenues by each taxing unit that levies taxes on the affected properties. Once the city initiates tax increment financing, counties and school districts may also participate in the tax increment financing program.

Transportation Policy

Dickinson

Street Prioritization Program – The City of Dickinson maintains a comprehensive Street Prioritization Program that helps in determining improvements needs that are essential to be included in the Capital Improvement Program (CIP). The CIP and the Street Prioritization Programs helps identify roadway needs in the City and to improve roadway connectivity and pavement quality.

The City of Dickinson currently does not have either a thoroughfare plan or a bicycle master plan. These two policy documents can help to improve traffic conditions and connectivity in the City not only for vehicle traffic but also for bicycle users as well.

League City

League City Master Mobility Plan (2011) — This is a multi-modal plan that not only examines the roadway network, but also the pedestrian network, bicycle lanes, shared-use paths (i.e., hike & bike trails), commuter rail, regional bus transit (park & ride), local bus transit, and marine transportation. This plan summarizes the multi-modal recommendations including year proposed and estimated cost to maintain League City's street network at a level of service (LOS) D.

Trails Master Plan (2010) — Trails Master Plan will expand the current trails system from 11.5 to 212 miles and include a paddle trail along Clear Creek. The Master Plan was developed based on four principles:

- Promoting connections to schools, parks, neighborhoods, and business centers;
- Providing an alternative way to commute and reach destinations;
- Creating healthy recreation and exercise opportunities; and
- Providing for athletic training.

H-GAC

H-GAC regional bike paths — Sidewalk and trail design should adapt to the surrounding environment, types of users, intensities of uses, and availability of land. The region benefits from a wide variety of pedestrian pathways that accommodate different functions: work commutes, school routes, and recreational activity. Each pathway should be designed to intersect at community nodes, which link pedestrians to employment centers, mixed-use districts, residential neighborhoods, shopping centers, transit stops, and multi-jurisdictional paths. Minimum design standards for most local sidewalks and trails are under the authority of local development ordinances and/or infrastructure standards. Local standards must meet or exceed the Texas Accessibility Standards and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) when involving places of public accommodation (e.g., parks, restaurants, retail stores, etc.). Other than fulfilling design minimums, the spatial dimension and configuration of each pathway should conform to local needs. Areas with more intense use (e.g., main streets) require wider pedestrian zones and generally benefit from the most public investment.

H-GAC's Pedestrian and Bicyclist Program focuses on four planning strategies to improve pedestrian mobility.

- *Regional Corridors* provide continuous travel through multiple jurisdictions, linking municipal, county, and state segments. Because they require continuous right-of-way, these corridors are often found along waterways, greenways, and utility easements. In a system that is only as strong as its weakest link, regional corridor planning identifies gaps in the network. This type of planning may entail new connections from one jurisdiction to another, improving or replacing existing pathway segments, or providing direct access to destinations.
- *Special Districts* are identified in H-GAC's Pedestrian and Bicyclist Special District Study as conducive areas for walking and bicycling based on demographic and physical characteristics. Pedestrian planning within these areas tends to focus on connectivity and beautification at the district scale.
- *Livable Centers* are mixed-use activity centers that are designed for pedestrian convenience. As one-stop destinations, they offer housing, employment, shopping, entertainment, and transit linkages within short walking distance. From conception, these destinations are designed with pedestrian-oriented and -scaled buildings, good separation of people on foot from vehicle circulation and parking, and community gathering spaces.
- *Transportation Improvements* of all types should optimize pedestrian travel, especially roadway construction, widening, and maintenance projects. These design considerations, when addressed in the initial planning stages, help to improve pedestrian safety and enhance the overall functionality of a project in the most cost-effective manner.

Pedestrian and Bike Infrastructure

While the west side of the corridor does not provide sufficient pedestrian facilities, pedestrian movement is somewhat accommodated on the east side of the corridor. Beginning at Cemetery Road up to FM 646, the FM 517 corridor lacks sidewalks. Then the sidewalks appear in short, discontinuous segments until SH 3, where they gradually become continuous throughout the rest of the corridor. Facilities accommodating bicyclists are currently unavailable for the corridor. In an effort to increase availability of multi-modal facilities, H-GAC maintains a Pedestrian/Bikeway Regional Plan, which can be viewed at http://www.h-gac.com/go/bikewayviewer. These proposed bikeway paths provide a better bike and pedestrian connectivity within the region. Currently, the existing bikeways within the region are FM 646 from IH 45 to FM 517, Calder Drive from FM 518 to CenterPointe Drive, Walker Street from SH 3 to Texas Avenue, Deke Slayton Highway (FM 518) from South Shore Harbour Boulevard to SH 146, Austin Street from Louisiana Avenue to South Shore Harbour Boulevard and along a drainage ditch behind Clear Falls High School to Las Palmas Drive.

5.3 CURRENT CORRIDOR CONDITIONS

Level of service (LOS) is an estimate of the amount of congestion that an intersection or section of roadway experiences and serves as a measure of how well traffic moves. LOS ranges from level A, where vehicles travel freely along the corridor, to level F, where vehicles suffer heavy congestion and delay. The segment and intersection LOS was calculated for the FM 517 corridor.

Segment Level of Service

The LOS for a segment depends on many factors that affect traffic along the corridor. Certain roadway characteristics such as signal green times, percentage of heavy vehicles, left turns, directional factors, and others contribute to the calculation of the capacity of a section. Segment capacity, which for an urban arterial such as SH 3 is 7,500 vehicles per lane per day, is used to then calculate the volume-to-capacity ratio. Based on certain thresholds of the volume-to-capacity ratio, the LOS of the segment can be determined. A segment with an LOS of D was determined to be acceptable for SH 3, while segments with an LOS E or F are considered excessively congested. **Table 5-3** summarizes the segment LOS for the study corridor.

Table 5-3: 2013 Corridor Level of Service

Section	Arterial LOS	
	NB	SB
Hughes to FM 517	C	B
FM 517 to Termini Street	D	F
Termini Street to Deats Road	C	B
Deats Road to FM 646	B	B
FM 646 to League City Parkway (EB)	C	B
League City Parkway (EB) to League City Parkway (WB)	B	B
League City Parkway (WB) to Walker	A	C
Walker to FM 518	F	D

Intersection Level of Service

The Highway Capacity Manual contains the methodology on how to calculate intersection delay (based on the average delay) for all approaches, and then associates the appropriate LOS to the approach and intersection. The methodology takes into account intersection lane configuration, speed limit, volumes, traffic signal timing characteristics, and other criteria. Synchro™ software, which incorporates the HCM methodology, was used in determining LOS for the SH 3 intersection during the AM and PM time periods. **Figure 5-18** summarizes LOS for all signalized intersections and corridor segments. **Table 5-4** provides the LOS and describes the deficient traffic movement at each intersection.

Table 5-4: Existing Intersection Operational Analysis							
Intersection	Approach	Deficient Movement	Approach Existing LOS AM	Approach Existing LOS PM	Intersection Existing LOS AM	Intersection Existing LOS PM	Comments
SH3 at Hughes Rd.	NB		D	C	C	C	Two schools in close vicinity. Recommend mast arm config; limit gas station access.
	EB		C	B			
	SB		D	C			
	WB		C	B			
SH3 at Termini St.	NB		A	A	A	B	Minor street volume low. No geometric improvements needed.
	EB		C	C			
	SB		A	A			
	WB		B	B			
SH 3 at Deats Rd.	NB		B	C	C	C	Minor street volume low. No geometric improvements needed.
	EB		C	C			
	SB		B	C			
	WB		C	C			
SH 3 at FM 646	NB		C	C	C	C	Grade seperation proposed in a future Transportation Improvement Program to be determined.
	EB		C	C			
	SB		C	C			
	WB		C	C			
SH 3 at League City PKWY (EB)	NB		E	E	F	F	Heavy eastbound thru volumes accommodated by shared thru/left/right turn lanes. Need an additional thru lane and an exclusive right turn lane. Grade seperation proposed in 2018.
	EB	EB Thru	F	F			
	SB		A	A			
	WB		-	-			
SH 3 at League City PKWY (WB)	NB		A	A	F	F	Heavy westbound thru volumes accommodated by shared thru/left/right turn lanes. Need an additional thru lane and an exclusive right turn lane. Grade seperation proposed in 2018?
	EB		-	-			
	SB		E	E			
	WB	WB Thru	F	F			
SH 3 at E. Walker St.	NB		C	C	D	D	Minor street volume low. No geometric improvements needed.
	EB		C	C			
	SB		C	C			
	WB		E	F			
SH 3 at W. Main St. (FM 518)	NB		D	F	D	E	Heavy northbound left turn volumes from SH 3.
	EB		D	D			
	SB		D	D			
	WB		C	D			

Figure 5-18: SH 3 - LOS for signalized intersections and segments

Chapter 6

Toolbox of Solutions

In order to help decision-makers in the area properly plan and manage the FM 517 and SH 3 corridors, the study team created a mobility toolbox that discusses multiple improvement options. These options include street improvements, technology systems, and other corridor management techniques. Some of the primary objectives of these tools are to increase mobility and safety for vehicular traffic. Another main goal of the toolbox is to improve the facilities for pedestrian and bicycle traffic. The existing facilities provide limited and substandard options for bicyclist and pedestrians. Improvements in this area would incentivize a more diverse mode choice for the corridor.

A multi-modal transportation system is unique in that it incorporates several modes of transportation into the network of facilities, and creates connections for travelers to go from one mode to the next. Facilitating seamless mode transitions can create a more livable space, and therefore a more desirable destination area, attracting travelers from a larger market area. H-GAC has shown its level of commitment to funding access management corridor plans, as can be seen from FM 518 and SH 6 projects, which have been previously studied and are currently under construction. The tools outlined in this report are strongly recommended for implementation in order to achieve the project goals of safety, mobility, and multi-modal connections.

6.1 INTERSECTIONS

Any time two travel ways merge, diverge, or cross, their mobility and safety are reduced. Intersections typically reduce speeds and increase crash rates, and can even hinder the ability to access properties adjacent to the intersection. However, if an intersection is properly planned, these negative effects can be minimized.

Types of Intersections

Major. Intersections of arterials and collectors with high volumes on both roads are classified as major intersections. These intersections are typically four-way and require signalization to manage the traffic demand effectively. Because of the level of traffic volume that is attracted by major arterials and collectors, businesses often desire to be near major intersections.

Major Intersection

Signal timing plans produce the sequence and duration for the traffic signals at an intersection and each traffic movement. Advanced traffic signal controllers provide greater flexibility in controlling the flow of traffic through an intersection. Implementing coordinated signal timing along a corridor can increase efficiency by allowing the highest possible number of vehicles to pass in the shortest time span. Coordinated signal timing can also positively affect air quality because travel time and idling, and vehicle acceleration and deceleration are reduced. These techniques can be used to increase capacity on corridors and is a less expensive option than adding lanes.

Minor. Minor intersections occur when local streets, minor collectors or minor arterials cross other like roads, whether it is another minor road or a major one. These intersections can be either three way or four way, or occasionally another configuration. Minor intersections can be signalized, two way or all way stop controlled, yield controlled, or not controlled, depending on the traffic demand at the intersection. For uncontrolled intersections, vehicle priority is determined by right of way rules of the road.

Street System

An interconnected street system is an established method for relieving traffic from major thoroughfares. Without connected side/back streets and local streets, all traffic is fed directly into the major thoroughfare which causes a bottleneck. Not only do bottlenecks decrease mobility and increase harmful emissions, but emergency vehicles are restricted in their ability to get to locations of critical events.

Minor Intersection

A well designed street network is made up by a diversified group of road types, including freeways, arterials, collectors, and connected local streets. This sustainable structure allows numerous paths upon which vehicles can travel, and distributes traffic more evenly than the network structure currently in place in the FM 517 and SH 3 corridors. Also, creating an interconnected network structure helps to avoid grade separating intersecting arterials and/or widening arterials, which are much more costly and less effective solutions than creating a stronger foundation of interconnected local streets for the roadway network.

Pedestrians and bicyclists also benefit from a stronger network of interconnected streets. Instead of being forced to travel along a busy arterial, they may utilize backage streets and reach their destination with much less risk of vehicular interaction. While sidewalks are currently available in limited areas along the corridors, there are still many areas without pedestrian facilities and pedestrians still traverse these areas, however unsafe it may be. Even when sidewalks and wider lines to accommodate bicycles are available continuously throughout a corridor, pedestrians and bicyclists would be safer using local streets.

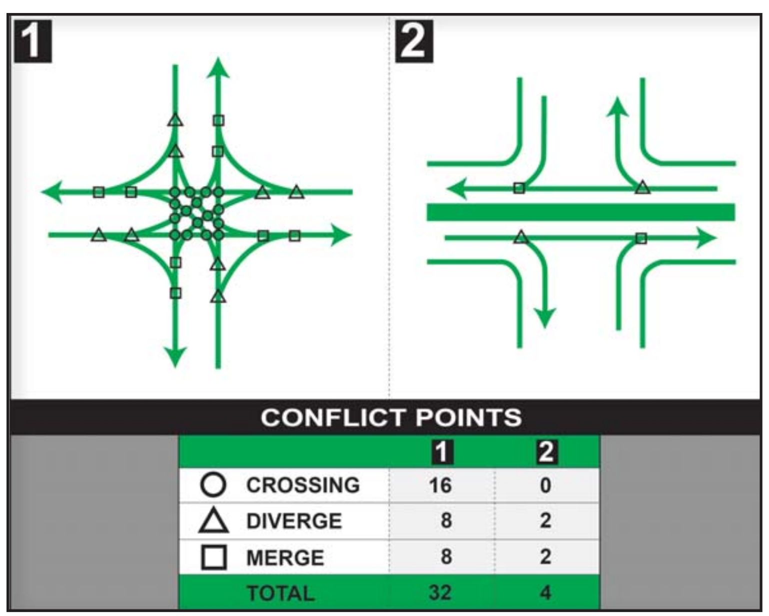
6.2 DRIVEWAY ACCESS STANDARDS

Reducing the number of driveways along a street can have positive benefits for the traveling public and property owners. Having fewer driveways reduces the number of conflict points along the street, thereby increasing safety. In many commercial areas, the length of frontage available to each property owner is limited, and limited frontage exposure makes it difficult to provide properly designed driveways. Eliminating driveways and sharing access can improve overall access and increase the available area for parking and deliveries. Reducing access locations is difficult because many property owners assume that the loss of access will result in a loss of customers. However, cross-access — that is, the movement of vehicles between two adjacent sites without having to enter the public street system — can be implemented along the corridors in select areas. The purpose of cross-access is to reduce the number of driveways as well as VMT on busy roads surrounding commercial centers. With this method, trips between neighboring sites will not have to proceed onto the major road network.

Driveway

6.3 RAISED MEDIANS

At each intersection, cross street, or driveway, a vehicle faces a number of conflict points with other movements of travel. Each of these conflict points poses an opportunity for the vehicle to hit another vehicle.



	1	2
CROSSING	16	0
DIVERGE	8	2
MERGE	8	2
TOTAL	32	4

Figure 6-1: Conflict Points

Introducing a raised median to restrict the movement of traffic at these locations reduces the number of conflict points from 32 to 4, as shown in **Figure 6-1**.

The Texas Department of Transportation (TxDOT) recommends that a raised median should be provided when the demand for mid-block turns is high and the average daily traffic (ADT) exceeds or is anticipated to exceed 20,000 vehicles per day. For these conditions, a raised median may improve safety by separating traffic flows and controlling left-turn and crossing maneuvers.

Roadways with raised medians are safer at higher speeds and at higher traffic volumes than undivided roadways of those with a continuous center turn lane much like what is found on both study area corridors. Based on studies conducted across the country, roadways with a raised median have an average crash rate of 30% less than roadways with a continuous left turn lane.

With the addition of a raised median, a determination of the most appropriate median openings and opening type will need to be addressed. The placement of the median opening must first consider the thoroughfare system. Priority should be given to those thoroughfares providing mobility and access generators along the corridor. The median treatment can take on many different forms. **Figure 6-2** on the right illustrates the variation available for a median opening.

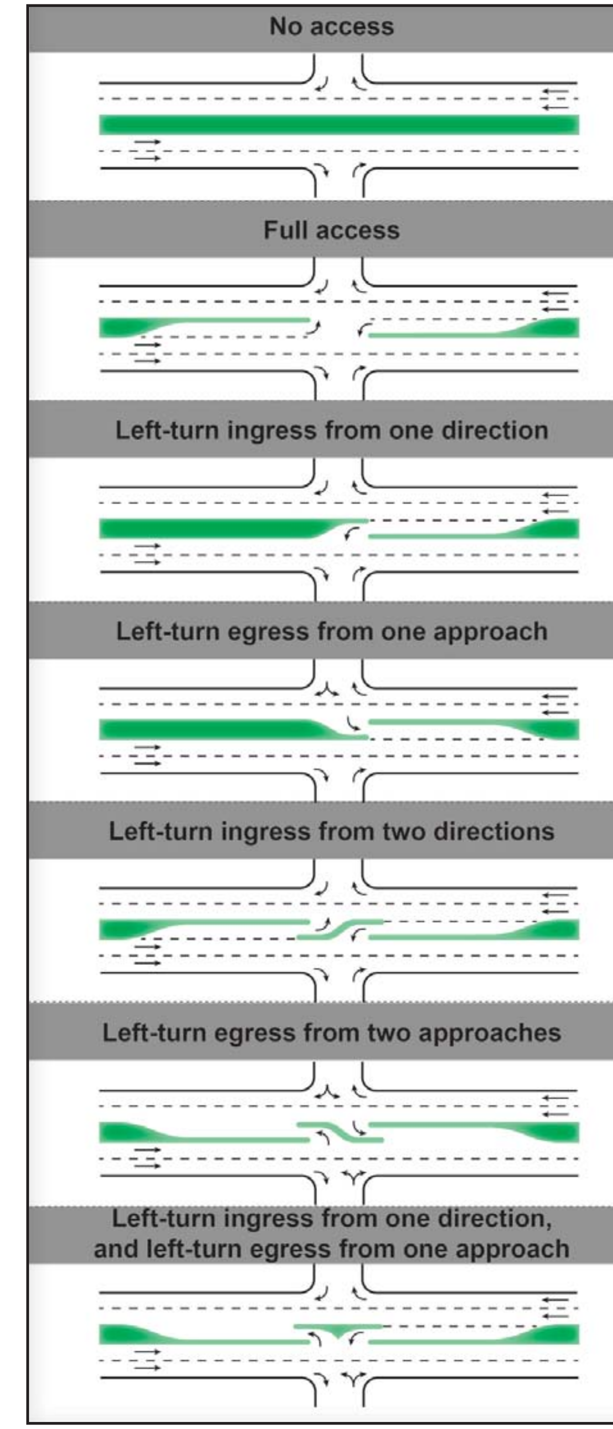


Figure 6-2: Median Types

6.4 LAND USE POLICY TOOLS

Comprehensive Planning – A comprehensive plan that addresses the needs which accompany growth provides developers, investors, and citizens with a degree of confidence that their investment in the community is sound. A comprehensive plan allows a community to portray their vision of what their city should look like in twenty to thirty years and should be updated at least every five to ten years. This process determines community goals and aspirations related to community development. The comprehensive plan dictates public policy in terms of transportation and thoroughfare planning utilities, land use, parks, and recreation, and housing at a minimum. Comprehensive plans typically encompass large geographical areas, a broad range of topics, and should cover short- and long-term priorities for the community. Successful comprehensive plans should include recommended implementation strategies and recommended Capital Improvement Plans, financing, and timing for public improvements necessary to implement the Vision of the Plan.

Form-Based Codes – Form-Based Codes address the relationship between building facades and the public realm, the form and mass of buildings in relation to one another, and the scale and types of streets and blocks. The regulations and standards in form-based codes, presented in both diagrams and words, are keyed to a regulating plan that designates the appropriate form and scale (and therefore, character) of development rather than only distinctions in land-use types. This is in contrast to conventional zoning's focus on the micromanagement and segregation of land uses, and the control of development intensity through sometimes abstract and uncoordinated parameters (e.g., floor area ratios, dwelling units per acre, setbacks, parking ratios) to the neglect of an integrated built form. Form-based codes are drafted to achieve a community vision based on time-tested forms of urbanism. Ultimately, a form-based code is a tool; the quality of development outcomes is dependent on the quality and objectives of the community plan that a code implements. Form Based Codes are a common sense blend of mitigating land uses with logical standards that can result in desired development outcomes. **Table 6-1** below identifies successful communities that have used Form Based Codes.

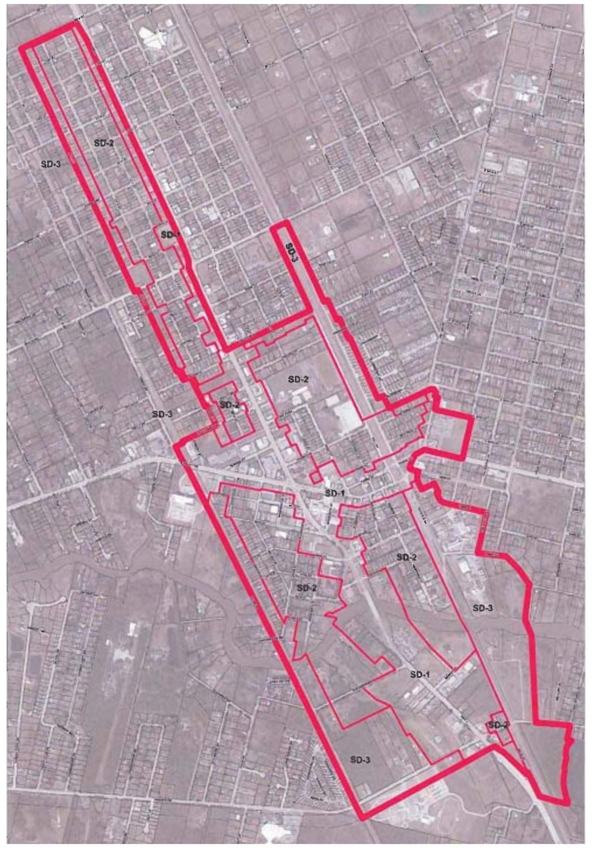
Table 6-1: Examples of Form Based Codes

District	Form-Based Codes
Carrollton – Transit Center Zoning District	TOD Zoning District, Article XX. (TC) Transit Center District Regulations
Dallas – Form Districts	Chapter 51A Article XIII: Form Districts
Duncanville – Downtown Duncanville District	Downtown Duncanville District
Farmers Branch – Farmers Branch Station	Long-Range Plans for Farmers Branch Station, Conceptual Master Plan
Fort Worth – Near Southside Development Standards and Guidelines	Near Southside Development District, Standards and Guidelines
Frisco – Planned Development District Form-Based Codes Manual	Form-Based Codes Manual
Keller – Old Town Keller Overlay District	Old Town Keller Overlay District
Lancaster - Campus District and Mill Branch Overlay District	Long Range Planning
McKinney – Regional Employment Center Overlay District	Article III Sec 146-99 REC Regional Employment Center Overlay
Mesquite – Truman Heights Revitalization Code and Gus Thomasson Corridor Revitalization Code	Truman Heights Revitalization Code, Gus Thomasson Corridor Revitalization Code
North Richland Hills – Transit-Oriented Development Code	Transit-Oriented Development District Code
Roanoke – Oak Street Corridor Zoning District	Chapter 12, Article III, Division 15, Oak Street Regulating Plan (Map)

(source: http://www.formbasedcodes.org)

Future Land Use Planning – The Land Use Plan is a part of the Comprehensive Plan. The Land Use Plan allows the community to identify the desired amount of various land uses in a variety of locations for the real estate development, economic growth, and open space that the City would project for the future. The land use plan is a synonym for the preferred future land uses of the community. The future land use plan does not necessarily show land use as it exists today, and it does not show future zoning information; it provides decision-making bodies information about the future goals of the City and the future land use map guides current decision making on variances, zoning requests or CIP programming to help make short-term decisions that result in the achievement of the future land use and comprehensive plan goals.

Special Area Districts/Overlay Districts – The purpose of a Special Area District or Overlay District is to allow for the application of specific regulations to a distinct geographic area. Special Area District or Overlay District are regulatory tools that create a special zoning district, placed over an existing base zones, which identifies special provisions in addition to those in the underlying base zone. The Special Area District or Overlay District concepts are typically discussed in a Comprehensive Plan as a method of preserving the character of an area. They encourage development to occur that is compatible with the existing scale and pattern of surrounding properties. The effect of a Special Area District or Overlay District will encourage property development which will maintain the unique characteristics of the area. They can manage development in or near environmentally sensitive areas, such as groundwater recharge areas to ensure water quality and quantity, special habitat or floodplains to prevent flood damage. Common requirements may include building setbacks, density standards, lot sizes, impervious surface reduction and vegetation requirements. Structure requirements could include building floor height minimums and flood-proofing to high water level. Special Area District or Overlay Districts may also be applied to protect historical areas or encourage or discourage specific types of development. Land within the historic overlay district may be subject to requirements that protect the historical nature of the area (e.g. materials, façade design, or color). A community might use incentives along a transit corridor to encourage higher development densities, target uses or control appearance.



SH 3 Overlay District

6.5 ECONOMIC POLICY TOOLS

380/381 Local Government Code Agreements — The City or county, by contract, provide incentives consisting of loans and grants of public funds, use of personnel, facilities and services with or without charge for economic development. This tool provides a developer with cash, reimbursement, or other consideration. According to Article III, Section 52-a - constitutional authorization - public purpose includes economic development.

City / County Venue Project Tax — Chapters 334 and 335 of the Local Government Code provide cities and counties the authority to finance a wide array of economic development projects called sports and community venue projects (venue projects). Cities and counties are authorized to propose at an election both the approval of venue projects and the revenue sources that would fund those projects. Cities and counties may choose to propose a venue project tax if they are interested in diversifying the sources of revenue they have to promote a venue project. The venue project revenue sources that can be adopted include a sales tax, a hotel occupancy tax, a short-term motor vehicle rental tax, an event parking tax, an event admissions tax and a venue facility use tax. Additionally, the venue sales tax can be proposed in certain limited cases even if the city is already at its maximum sales tax rate. A city or county may undertake a venue project under Chapter 334 of the Local Government Code if it receives voter approval of the venue project and financing. At this election, the city or county must specifically indicate which of six different taxes or fees it will use to pay for the costs of the project.

Alternatively, two or more cities, two or more counties, or a combination of cities and counties may create a "sports and community venue district" under Chapter 335 of the Local Government Code. Subject to voter approval, such a district may carry out the same type of projects and propose the same financing methods as an individual city or county can under Chapter 334.

Finally, Section 321.508 of the Tax Code allows a city to call an election on the dedication of up to 25% of its existing sales tax to pay off debt issued to finance one or more economic development projects located in the city. (source: 2013 Economic Development Handbook • Office of the Attorney General)

Development Agreements - Types and Authority:

- Local Government Code Section 212.172
- Development Agreements in the ETJ
- Developer Participation Agreements
- Industrial District Agreements

Hotel Occupancy Tax (HOT) — A city may implement a hotel occupancy tax by adopting an ordinance calling for the levy of the tax. The ordinance needs to be approved by a simple majority of the members of the governing body at an open meeting. Unlike a local sales tax, the adoption of a local hotel occupancy tax does not require voter approval. Although not mandated by state statute, a city may hold a public hearing to give the public an opportunity to express its views regarding the implementation and potential uses of the tax. (source: 2013 Economic Development Handbook • Office of the Attorney General)

Manufacturing Sales Tax Exemption — Machinery and equipment that is used in the manufacturing, processing, fabricating or repairing of tangible personal property for ultimate sale, are exempt from state and local sales tax. The exemption also applies to tangible personal property that makes a chemical or physical change in the product being manufactured and is necessary and essential in the manufacturing process. Some items, such as hand tools, are excluded from the exemption. A hammer, for example, is taxable even if it is used in fabricating a product for sale.

Municipal Agreement Not to Annex — To attract a business into an area, a city may choose to encourage the business to locate in the city's extraterritorial jurisdiction. If the business locates in the city's extraterritorial jurisdiction, the city may enter into an agreement not to annex the business property for a set period of time. In this way, the city gets the benefit of having the business locate in the area and the creation of additional jobs. The business in turn is freed from ad valorem taxation of its property by the city for the designated period of time. This approach is termed an "agreement not to annex" and is authorized under Section 42.044 of the Local Government Code. (source: 2013 Economic Development Handbook • Office of the Attorney General)

Municipal Development Districts — The publicly elected Board of Directors manages and controls all of the affairs of the MUD subject to the continuing supervision of the Texas Commission of Environmental Quality. The Board establishes policies in the interest of its residents and utility customers. A MUD may adopt and enforce all necessary charges, fees and taxes in order to provide district facilities and service. In addition to their common functions of water and wastewater service, MUDs are legally empowered to engage in conservation, irrigation, electrical generation, firefighting, solid waste collection and disposal, and recreational activities (such as parks, swimming pools, and sports courts). A MUD can provide for itself the recreational amenities that are approved by the Board of Directors and funded by the District. Developers must petition the Texas Commission of Environmental Quality to create a MUD. Developers are prohibited from serving or placing employees, business associates, or family members on the MUD Board of Directors. Developers must pay for or put up a letter of credit equal to 30% of the cost of subdivision utilities. This requirement ensures against "fly-by-night operators" who are not committed to the success of the MUD. The "30% rule" also offers protection to MUD residents in the event that a subdivision is not built according to schedule. Unless they are voting residents within a MUD, developers have no authority or control over the MUD's Board of Directors. If they are voting members of a district, they have the same power to vote and attend Board Meetings as any other resident. (source: http://www.jbgoodwin.com/knowmud.htm)

Neighborhood Empowerment Zones — LGC Section 378.002 allows creation of a NEZ if the creation of the zone would promote the following within the zone:

- Affordable housing (including manufactured housing);
- An increase in economic development;
- An increase in the quality of social services, education or public safety provided to residents;
- The rehabilitation of affordable housing.

Upon creation of a NEZ a city is empowered, in addition to other powers, to:

- Waive Building Fees;
- Refund Municipal Sales Taxes; and
- Abate Property Taxes.

Pollution Control Property Tax Abatements — Available to companies with facilities, devices and equipment used to control air, water or land pollution. Companies wishing to apply for tax relief for their efforts in controlling pollution can apply for a tax credit from the Texas Commission on Environmental Quality (TCEQ).

Public Improvement Districts — Chapter 372 of the Local Government Code. Public Improvement Districts give municipalities the authority to levy and collect special assessments on property created in a district that is within the municipality or within the municipality's extraterritorial jurisdiction (ETJ). A PID may be formed to accomplish any of the following goals:

- Water, wastewater or drainage improvements;
- Street, sidewalk, Parking and mass transit improvements;
- Library, parks, recreation, art and cultural improvements;
- Landscaping and other aesthetic improvements;
- Creation of pedestrian malls; and
- Other similar improvements.
- *Sales Tax to Promote Economic Development* — The use of the sales tax for economic development purposes has been one of the most popular and effective tools used by cities to promote economic development.

The Type B tax can be used to fund the provision of land, buildings, equipment, facilities, expenditures, targeted infrastructure and improvements that are for the creation or retention of primary jobs for projects such as manufacturing and industrial facilities, research and development facilities, military facilities, including closed or realigned military bases, transportation facilities, sewage or solid waste disposal facilities, recycling facilities, air or water pollution control facilities, distribution centers, small warehouse facilities, primary job training facilities for use by institutions of higher education, regional or national corporate headquarters facilities, eligible job training classes, certain career centers and certain infrastructural improvements that promote or develop new or expanded business enterprises. However, the Type B tax can additionally fund projects that are typically considered to be community development initiatives. For example, authorized categories under Type B include, among other items, land, buildings, equipment, facilities, expenditures, and improvements for professional and amateur sports facilities, park facilities and events, entertainment and tourist facilities, and affordable housing. Also, the Type B tax may be expended for the development of water supply facilities or water conservation programs. In order to undertake a water supply facility or water conservation program, the facility or program has to be approved by a majority of the qualified voters of the city voting in an election called and held for that purpose. Additionally, certain Type B development corporations are allowed to do projects that promote new and expanded business development. (source: 2013 Economic Development Handbook • Office of the Attorney General)

Skills Development Fund — Created to train employees through customized job training programs provided by the state's community colleges. This fund is administered by the Texas Workforce Commission, is application driven and competitively based. The grants are provided to community colleges and technical schools as part of a partnership with companies and labor unions to provide training not currently available in the region. Average training grants per trainee are $1,000.

Tax Abatements — Tax abatements are used by local governmental entities to attract new business and to encourage the retention and development of existing businesses for their area. Incorporated cities, counties and special districts are allowed to enter into tax abatement agreements. However, school districts may not enter into tax abatement agreements under Chapter 312 of the Tax Code. Instead, a school district's ability to limit appraised values on certain property is found in the Texas Economic Development Act, chapter 313 of the Tax Code.

Whether a city or a county may initiate a tax abatement agreement depends upon the location of the property that would be subject to the tax abatement. If the property subject to abatement is located within the city limits, the city would be the lead party in the tax abatement. If the property to be abated is located within the extraterritorial jurisdiction (ETJ) of the city, either the city or the county may serve as the lead party. If the property is located outside the city's boundaries and outside the city's ETJ, the county must serve as the lead party for tax abatement. (source: 2013 Economic Development Handbook • Office of the Attorney General) *Tax Increment Financing (TIF)* — TIF financing is a tool that local governments can use to publicly finance needed structural improvements and enhanced infrastructure within a defined area. These improvements usually are undertaken to promote the viability of existing businesses and to attract new commercial enterprises to the area. The statutes governing tax increment financing are located in Chapter 311 of the Tax Code.

The cost of improvements to the area is repaid by the contribution of future tax revenues by each taxing unit that levies taxes against the property. Specifically, each taxing unit can choose to dedicate all, a portion, or none of the tax revenue that is attributable to the increase in property values due to the improvements within the reinvestment zone. The additional incremental tax revenue that is received from the affected properties is referred to as the tax increment. Each taxing unit determines what percentage of its tax increment, if any, it will commit to repayment of the cost of financing the public improvements. In addition, the governing body of a city may determine, in an ordinance designating an area as a reinvestment zone or in an ordinance adopted subsequent to the designation of a zone, the portion or amount of tax increment generated from municipal sales and use taxes attributable to the zone, above the sales tax base, to be deposited into the tax increment fund. (source: 2013 Economic Development Handbook • Office of the Attorney General)

Texas Economic Development Act — The Texas Economic Development Act ("the Act'") is another economic development tool used to attract new industries and commercial enterprises. Chapter 313 of the Tax Code authorizes certain property tax incentives for economic development provided by school districts. School districts have the ability to provide tax credits and an eight-year limitation on appraised value of a property for the maintenance and operations portion of the school district property tax to eligible corporations and limited liability companies. The property remains fully taxable or the purpose of any school district debt service tax. (source: 2013 Economic Development Handbook • Office of the Attorney General)

Strategic Partnership Agreements (SPA) — SPA, are a form of development tool that is primarily used in Houston and in some cases in Austin whereby a MUD can partner with the city to share sales tax with the governing city, but not be annexed into the corporate limits of the City. This tool should be evaluated against the vision and goals of the Comprehensive Plan as there is not long term history on the effectiveness of the SPA and the community long term goals. This tool is basically 13 years old and most agreements have been written for 20 years or longer. Therefore, it remains to be seen if the areas could politically be annexed after that length of time. SPA's also impact county governance as well since counties are not set up for urban issues and maintaining local streets or utilities.

Texas Emerging Technology Fund (ETF) — This fund was created to provide Texas with an unparalleled advantage in the research, development and commercialization of emerging technologies. The program works through partnerships between the state, institutions of higher education and private industry and is dedicated to three areas: Regional Centers of Innovation and Commercialization; matching grant funds for R&D projects that accelerate commercialization and that have demonstrated an ability to receive or have received federal grants or non-state grants; and assisting Texas public universities in attracting highly renowned research teams from universities and institutions in other states.

Texas Enterprise Zone Program — Allows local communities to partner with the State of Texas to promote job creation and capital investment in economically distressed areas. Companies may qualify for refunds of state sales tax paid on eligible items used at the qualified business site. The total amount of any refund is predicated on the investment amount and number of jobs created/retained at the qualified business site. In order to qualify, companies must commit that at least 25% of their new employees will meet economically disadvantaged or enterprise zone residence requirements - if the company is locating or expanding into one of the state's Enterprise Zones. If the company is not locating into one of the Enterprise Zones, then they must commit that at least 35% of their new employees will meet economically disadvantaged or enterprise zone residence requirements.

Texas Product Development Fund — The Fund provides financing to aid in the development, production and commercialization of new or improved products within the state. Products appropriate for the fund are inventions, devices, techniques or processes that have advanced beyond the theoretical stage and are ready for immediate commercial application. Preference for funding will be given to the state's defined industry clusters within emerging technology fields, including: semiconductors; nanotechnology; biotechnology and biomedicine; renewable energy; agriculture and aerospace.

Example of shared-use vehicle and bike lane

Texas Small Business Fund — Provides financing to foster and stimulate the development of small and medium sized businesses in Texas. Special funding preferences will be given to emerging technologies including: semiconductors, nanotechnology, biotechnology and biomedicine, renewable energy and aerospace. Additional preference will apply to applicants that have acquired other sources of financing, have formed companies in Texas and are receiving assistance from designated state small business development centers or through the Small Business Innovation Research program (SBIR).

6.6 TRANSPORTATION POLICY TOOLS

Bike Master Plans — A Bicycle Master Plan is a document that describes long-range planning for developing bicycle infrastructure in a city, with emphasis on designating and expanding bike routes, fostering a safe environment for cycling, and promoting bicycling as a viable transportation option. It usually details bike routes in the surrounding communities, connecting bike lanes to create continuous, safe bicycling routes.

Thoroughfare planning — An adopted Major Thoroughfare & Collector Plan is a mechanism to require dedication of ROW to create a network of major thoroughfare and collector streets within the city and EJT. The Plan can also include hike and bike trails as well as transit plans for streets. As areas become more populated, logical spacing between collector streets and major thoroughfares allows the traffic to disperse on multiple roadways. The more connected a city's street network is within its boundaries and adjacent cities, the more efficiently the street system works.

A major thoroughfare/collector plan is necessary to adequately plan for future growth and development of the community. It should be part of the Land Use Plan to help see that future land use and development is served without inducing cut through traffic within neighborhoods. The major thoroughfare/collector plan should set forth alignments and design criteria for future roadway improvements and roadway extensions necessary for development of the community. The major thoroughfare/collector plan should be consistent with the communities land use and/or zoning ordinance.

Transit Planning — Transit planning involves the evaluation, assessment, design and location of transport facilities including streets, highways, bike lanes and public transport lines. Transit Planning is important for shaping the cities, enabling economic activity, promoting community interaction, enhancing quality of life and providing location between geographical locations. (source: http://transportation-planning.blogspot.com) In traditional urban areas, a public transit system may attract enough ridership to support high frequencies of service. At these high frequencies, services can operate at demand service levels where the specific frequency of service in each corridor can be independent and where transfers can reasonably occur at random. In less densely developed areas public transit service may operate somewhat infrequently.

Chapter 7
Implementation

7.1 IMPROVEMENT FACTORS

The recommendations in this chapter are a combination of tools presented in the Toolbox chapter to minimize current issues identified in the Existing Conditions chapter and to achieve the goals set in the Corridor Goals chapter. Recommendations are based on valuable input from the public; the steering committee; and the stakeholder committees, focus groups, and public officials. Crash analysis was done to determine the state of safety along the corridor, and traffic analysis was performed to find the level of congestion along the corridors. Right-of-way (ROW) acquisitions were also considered and minimized to avoid impacting current residences and businesses.

All improvements recommended in this chapter are conceptual and based upon a range of factors: accident data, congestion levels, right-of-way, lack of signage, safety concerns and input received throughout the public involvement process. The planning approach to implementing improvements is divided into three phases for each jurisdiction and each corridor. **Table 7-1** below describes the general characteristics of each phase.

Table 7-1: Improvements

Improvement	Short-term	Med-term	Long-term
Implemented in 0-5 years	X		
Implemented in 5-15 years		X	
Implemented in more than 15 years			X
Intersection lane configuration and turn bay storage	X	X	
Upgrade intersection signal equipment	X	X	
Convert two-way left turn lane to a raised median	X	X	X
Add continuous sidewalks	X	X	X
ROW acquisition		X	X
Lane additions		X	
Side street realignment		X	X
Thoroughfare planning		X	X
Landscaping	X	X	X
Grade separation at intersections (by TxDOT)		X	X
Reconfiguration of IH 45 ramps (by TxDOT)		X	
Dictated by future development plans			X

The implementation plan will include short-, medium- and long-term improvements. The long-term improvements should be considered as redevelopment is planned and congestion increases. The 2035 regional demographics developed by H-GAC estimate an additional 75,000 households over the next 20 years will be constructed within the area served by the FM 517 and SH 3 corridors (**Figure 7-1**). With an average of 10 vehicle trips per household per day, an additional 750,000 trips per day could be added to area roadways. Cost effective strategies such as access management will be required in order to manage congestion caused by increasing traffic volumes. As development plans become more focused, the long-term recommendations of the implementation plan can be used as a communication tool for City staff and developers in coordinating future transportation infrastructure.

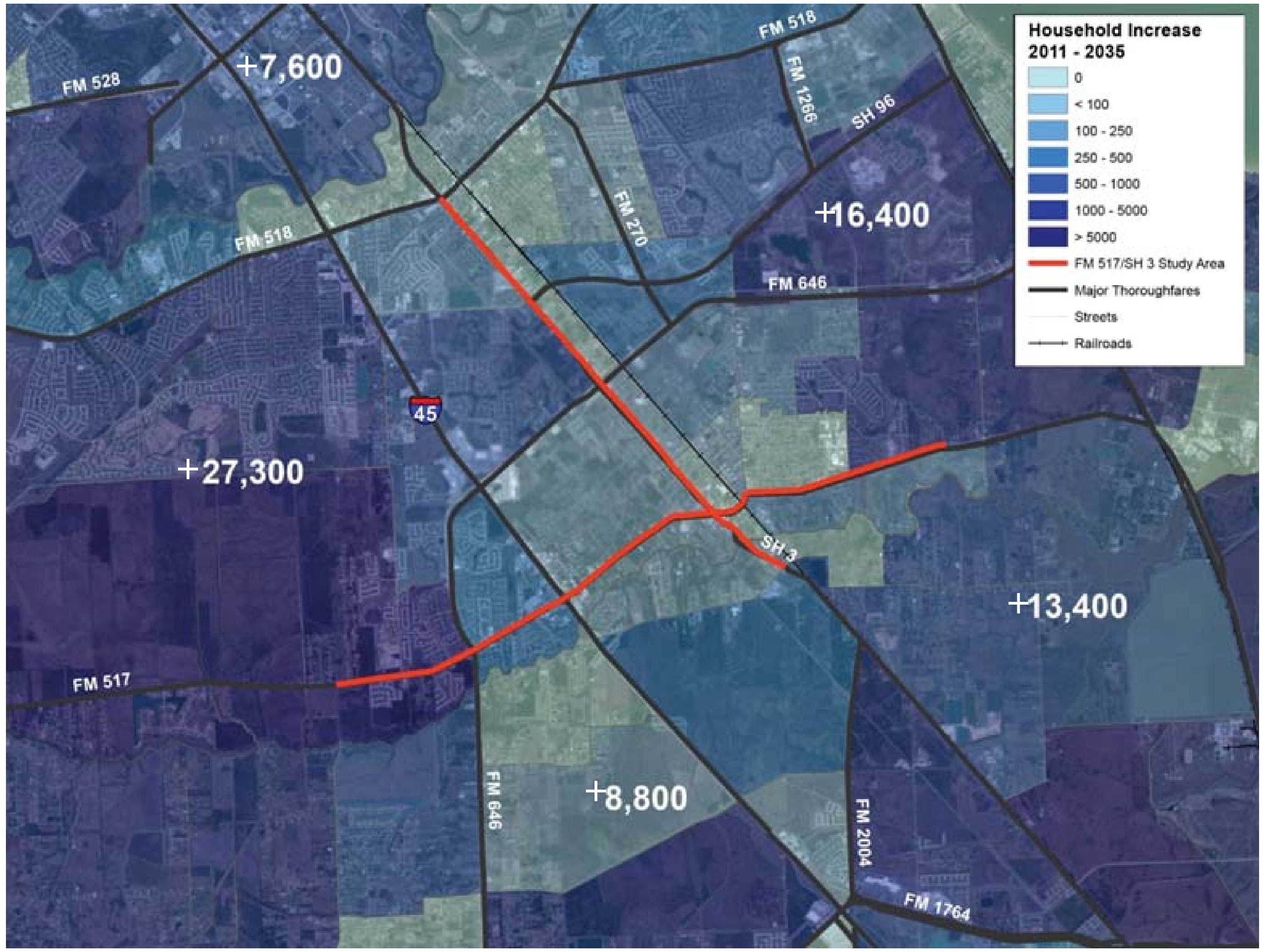


Figure 7-1: Projected Area Growth

The FM 517 and SH 3 corridors are within the jurisdiction of the City of Dickinson, the City of League City, and Galveston County (**Figure 7-2**). While the ROW for the corridors is owned and maintained by TxDOT, the jurisdictions still have a critical role in this project.

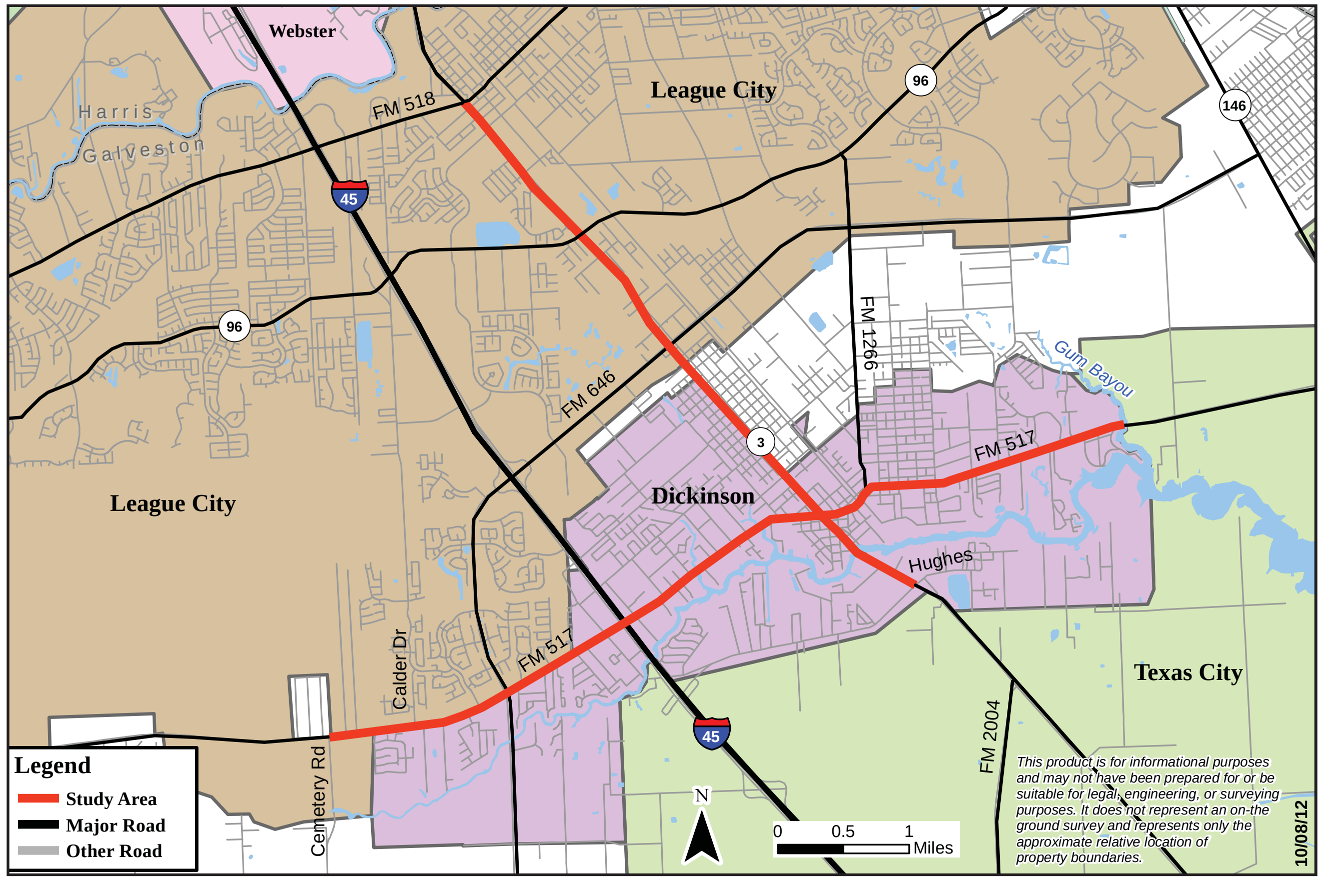


Figure 7-2: Study area and jurisdictional boundries

7.2 CITY OF DICKINSON IMPLEMENTATION

City of Dickinson jurisdictional boundaries cover areas of both corridors (see **Figure 7-2**). While TxDOT maintains the corridors, the City of Dickinson maintains the cross streets. The TxDOT ROW within Dickinson city limits is from Shoreview Drive to Gum Bayou. Dickinson city limits also contain the south side of the SH 3 corridor from Hughes Road to 20th Street and all the adjacent land, except east of the road from Salvato Street to 20th Street. The improvements in this section include short-, medium-, and long-range summaries for each improvement on FM 517 and SH 3. **Design details and preliminary cost estimates are included in the Appendix.**

Landmark and Aesthetic Features

As roadway segment improvements are recommended, the City of Dickinson should use low-cost aesthetic features to improve Dickinson's image and sense of place. Features such as landmarks, wayfinding, and median aesthetics could be used to highlight the City and invite people in to linger and shop, not to rush them through. These types of features could tie into the historical feel that will be created from the SH 3 Overlay District. They also mark breaks in different sections of the City and in cross-section design.

Wayfinding entry features

Short Term Improvements

Traffic Signal Improvements. Improved signal timing and traffic signal infrastructure improvements can have a significantly positive impact on the safety and mobility of a corridor. Traffic signal coordination occurs when two or more adjacent intersection traffic signal controllers are programmed such that a platoon of vehicles can progress smoothly though the set of intersections without stopping. For this to occur, the controller programming must account for parameters such as vehicle speed and distance between intersections. Additionally, the traffic signal controllers must maintain the same time clock so that the intersections do not become "out of step" with each other, which can cause poor signal coordination. Coordination can occur for these corridors by several methods, including but not limited to time-based coordination or closed-loop system.

Currently, all traffic signals operate with separate traffic signal controllers that are not linked to together. When signal-controlled intersections are not linked it is possible to provide sufficient coordination through time based coordination, but it is common that controllers may become “out of step” with each other, which can degrade coordination. To avoid this, GPS clocks are installed that communicate with external sources to ensure accurate timekeeping. A closed-loop system has local controllers at individual intersections and continuous communication with a field master. This connection allows the field master to supervise operation of local controllers to assure they are operating on the proper timing plan.

As mentioned previously, signal timing and coordination will be a powerful tool used to improve traffic conditions within the City of Dickinson. All traffic signals will receive timing improvements, and traffic signals that are close enough to each other to where coordination can be effective. For FM 517 between Timber Drive and Owens Drive, six (or potentially seven) signals are spaced closely enough to where it is feasible to coordinate the signals. For the section of SH 3 that is within Dickinson city limits, the four signals from Hughes Lane up to Deats Road could benefit from coordination. TxDOT maintains all signals within the City of Dickinson.

FM 517

Roadway Segment Improvements. The most critical section of the FM 517 corridor is from FM 646 to Spruce Drive. This section contains the most congestion, the highest crash rate and a high density of driveways accessed by a continuous two-way left-turn lane. Most of the access points for these businesses are along portions of the roadway where the typical peak hour queue forms west of the IH 45 interchange, creating a somewhat tangled disarray of potential vehicle paths. This scenario makes it difficult to make westbound left turns across the heavy eastbound congestion, and as drivers wait longer for an acceptable gap in traffic, they are more likely to make risky turning movements. Creating a more efficient option for left-turning vehicles would provide a safer environment and increase mobility. This can be done by adding a raised median in place where currently a two-way left turn lane exists. Median openings would be provided as frequently as possible while still maintaining the proper spacing and deceleration lengths required by TxDOT. **Recommendations for median openings are in Appendix A.**

One of the most crucial movements in this critical area of FM 517 is the eastbound left turn into the Dickinson Village shopping center. This section of FM 517 is shown in **Figure 7-3**. Many frequented businesses, including, but not limited to Kroger, Starbucks, and Subway, must be accessed via a single point of entry along FM 517, just 200 feet west of the IH 45 interchange. For this specific movement, an eastbound-only turn will be provided to allow eastbound vehicles to turn left into Dickinson Village, but not turn left when exiting the shopping center. In order for vehicles to travel eastbound out of the shopping center, the southbound frontage road will be used. This eliminates left turns when exiting the shopping center on FM 517, where vehicles are crossing many different paths and then trying to merge into traffic at an often congested intersection. **Figure 7-4** shows the existing and proposed short-term roadway section between FM 646 and Spruce Drive.

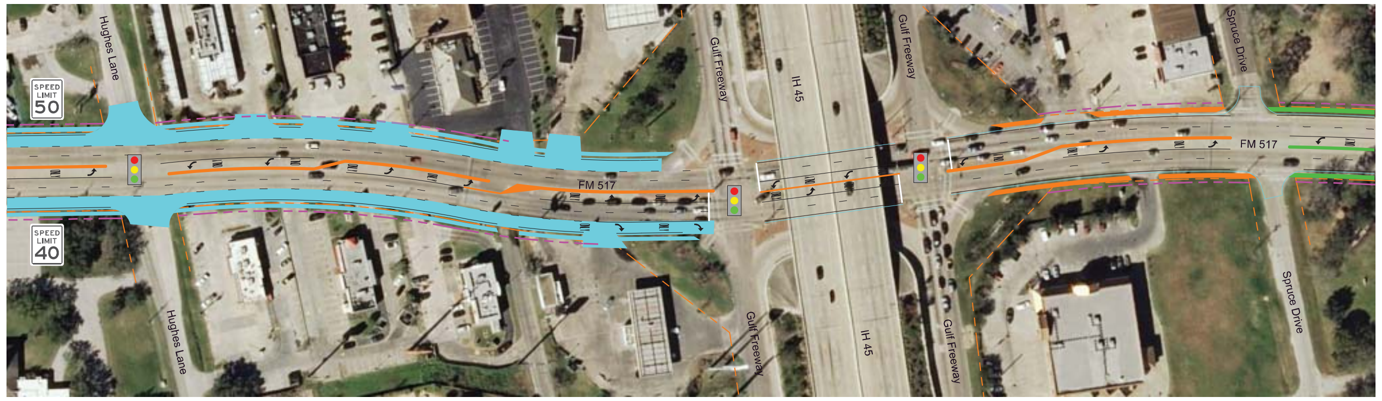


Figure 7-3: FM 517 - Hughes Lane to Spruce Drive

Potential Signal Installation. If medians are constructed on FM 517, the Hughes Lane/Medical Park Drive cross street would offer a centralized alternative for westbound left turns to many of the nearby businesses. This area also has the potential to provide excellent cross access between many of the businesses near that intersection. As the current volumes at Hughes Lane/Medical Park Drive are already significant, it may be beneficial to install a signal at this intersection. However, a warrant study must be done by TxDOT to justify installing a signal. While the close proximity (approximately 750 feet) of Hughes Lane/Medical Park Drive to the IH 45 signalized intersections could be a concern, improved signal timing coordination can maximize vehicle progression through these closely spaced intersections.

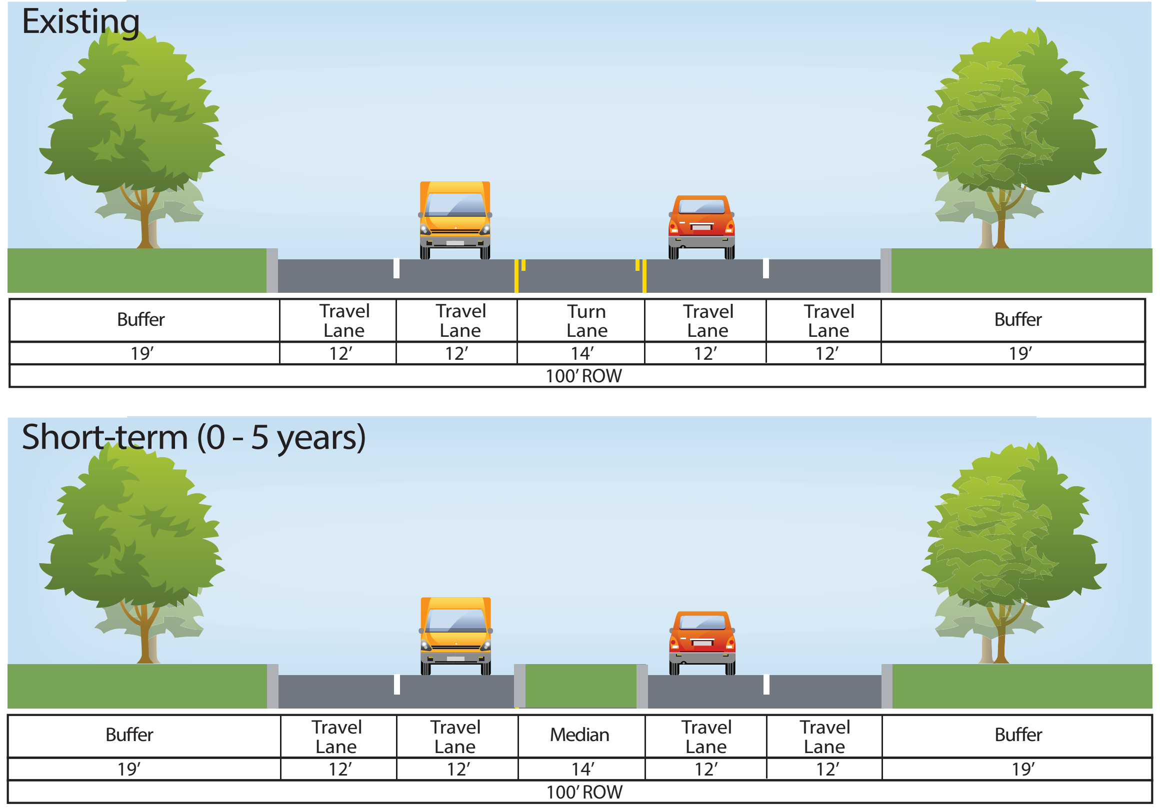


Figure 7-4: FM 517 - FM 646 to Spruce Drive

SH 3

Intersection Improvements. The study team identified a need for intersection improvements at the intersection at SH 3 and Hughes Lane. Based on traffic analysis and public comments, there is a need for an exclusive right turn lane for the southbound approach as shown in **Figure 7-5**. The number of vehicles is high enough to justify this extra right turn storage, likely due to the traffic going to McAdams Junior High School.

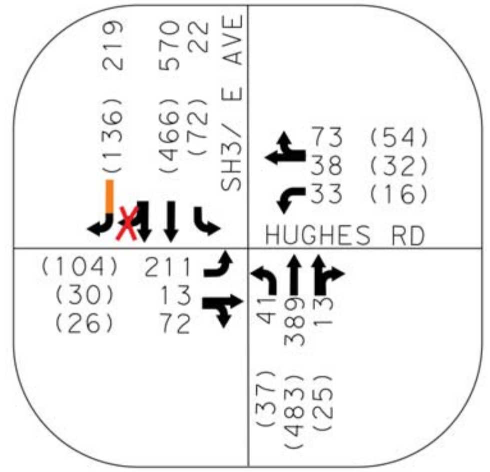


Figure 7-5: AM (PM) Peak Hour Volumes for SH 3 and Hughes Road

Medium-term Improvements

FM 517

Roadway Segment Improvements. From Borden Gully Drive to Spruce Drive, it is recommended that the FM 517 pavement be widened to accommodate an additional through lane in each direction (6 lanes total), and the median constructed in the short-term recommendations be widened to a full 18-foot median. The additional capacity will reduce the congestion and decrease vehicle queuing near the I 45 interchange. ROW acquisition will be required to do this widening, as shown in **Figure 7-6**. Pedestrian facilities are limited throughout the critical section of FM 517. The study team has witnessed pedestrians walking, using wheelchairs, and riding bicycles within the roadway lanes and shoulders because there is a lack of continuity in the existing sidewalk system. These practices decrease traffic flow and safety for both pedestrians and motorists. Continuous sidewalks will be installed along FM 517 from FM 646 to Spruce Drive, as also shown in **Figure 7-6**. This will improve pedestrian mobility in the area, and may even encourage some travelers to walk or bike instead of drive, which further alleviates traffic.

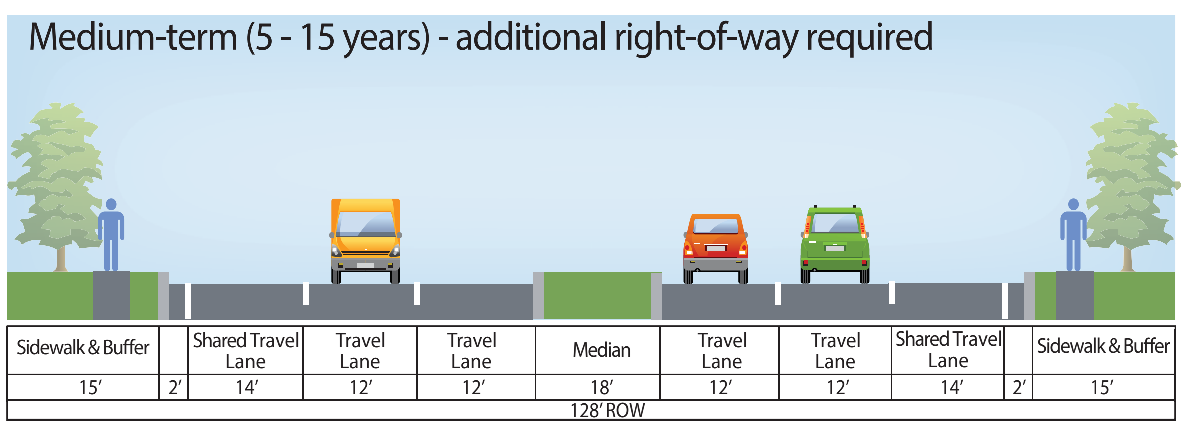


Figure 7-6: FM 517 - FM 646 to Spruce Drive

The study team's recommendation for the section along FM 517 from Timber Drive to SH 3 includes the two-way left turn lane being converted to a raised median, as shown in **Figure 7-7** on the following page. Sidewalks are mostly present along this four block section, but any breaks in continuity would be constructed. This section is recommended as medium-term because it is close to one of the busiest intersections in the area (FM 517 at SH 3) and there are many driveways and minor intersections along the section, as shown in **Figure 7-8** on the following page. The speed limit is 30 mph in this section, but a significant portion of vehicles have been reported to be speeding through this section. **Design details and preliminary cost estimates are provided in the Appendix.**

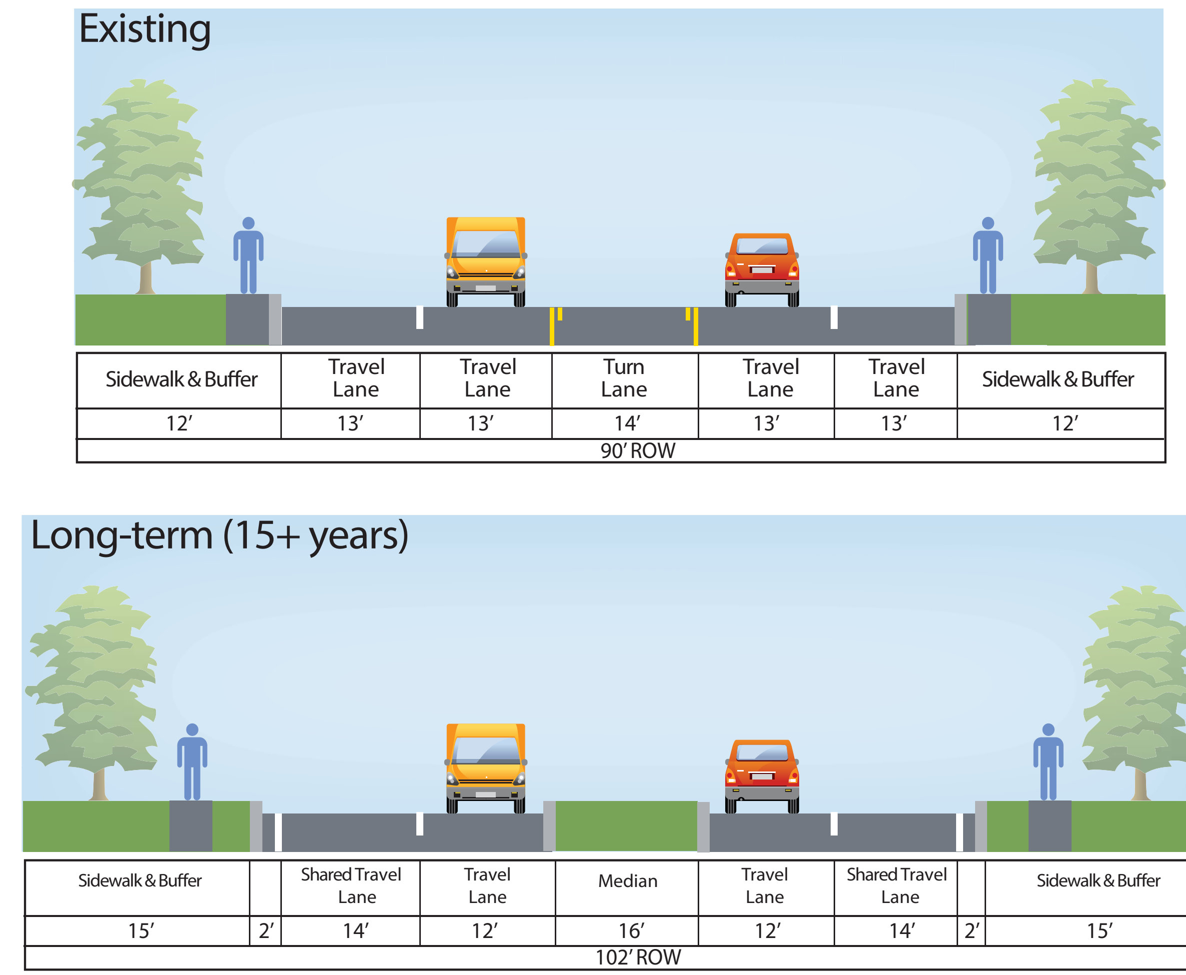


Figure 7-7: FM 517 - Timber Drive to SH 3

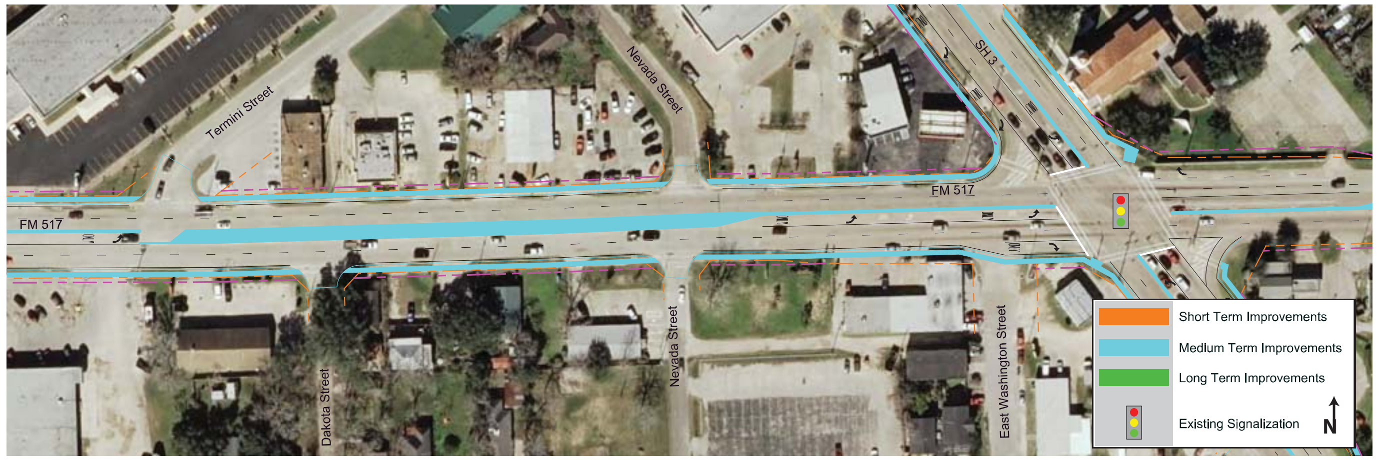


Figure 7-8: FM 517 - Timber Drive to SH 3

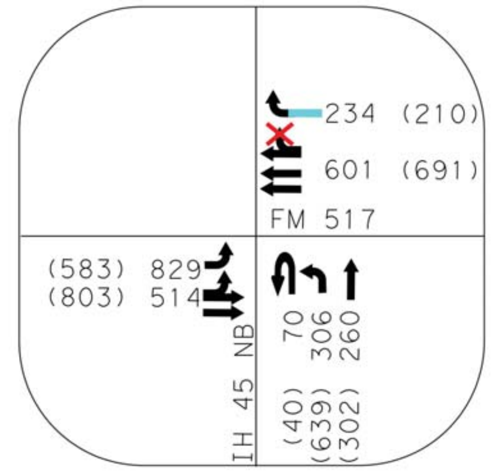


Figure 7-9: AM (PM) Peak Hour Volumes for FM 517 and IH 45 Northbound Frontage Road

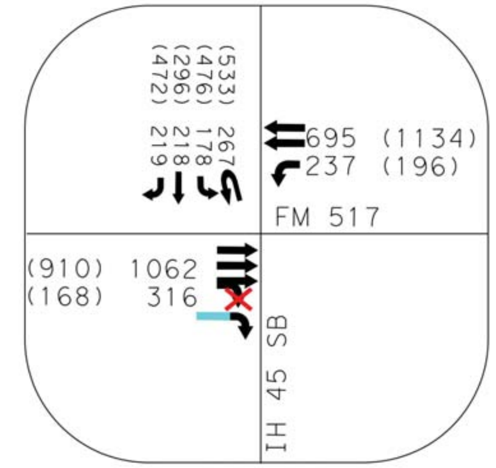


Figure 7-10: AM (PM) Peak Hour Volumes for FM 517 and IH 45 Southbound Frontage Road

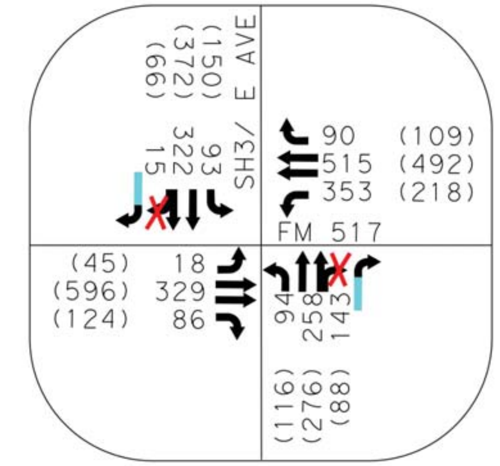


Figure 7-11: AM (PM) Peak Hour Volumes for FM 517 and SH 3

Intersection Improvements. The close proximity to the Gulf of Mexico gives the Houston-Galveston area a high likelihood of inclement weather. The durability of traffic signals is crucial for the safety of any vehicles attempting to travel in high wind and heavy rain situations. The existing configuration of many traffic signals along FM 517 and SH 3 may not sufficient for the high wind loads that can be experienced during a hurricane. Upgrading intersection infrastructure to a signal pole and mast arm configuration properly designed to handle harsh weather can not only increase safety, but also save money.

Table 7-2 describes the recommended intersection improvements. Based on an operational analysis of existing and future traffic, it is recommended that additional right turn storage is provided for the IH 45 interchange as well as the FM 517/SH 3 intersection, as shown in **Figures 7-9**, **7-10**, and **7-11**. A traffic signal upgrade to pole and mast arm construction for the intersections along FM 517 of Fire Station access and Timber Drive is recommended when the medium term roadway segment improvements are constructed.

Table 7-2: Intersection Improvements

Fire Station West of IH 45	Upgrade traffic signal to pole and mast arm when roadway segment improvements are done
IH 45	Add storage to the westbound and eastbound right turn bays
Timber Drive	Upgrade traffic signal to pole and mast arm when roadway segment improvements are done
SH 3	Add storage to the northbound and southbound right turn bay

SH 3

Roadway Segment Improvements. A raised median is recommended along SH 3 from Hughes Lane to Deats Road, as shown in **Figure 7-12**. This section has similar characteristics to the section on FM 517 from Timber Drive to SH 3 in that it has a high number of driveways and intersections in close proximity to the major intersection of FM 517 and SH 3, as shown in **Figure 7-13**. However, the speed limit is 40 mph in this section. There are also many commercial businesses along this section and a consequently a high number of vehicles turning into and out of the many driveways and intersection along the corridor. Sidewalks will also be constructed where currently absent along this section of SH 3. **Design details and preliminary cost estimates are provided in the Appendix.**

Potential Signal Installation/Removal and City Roadway Re-alignment. Potential signal modifications are recommended for Termini Street at SH 3, also shown in **Figure 7-13**. If medians are constructed along SH 3, there would be insufficient space to fit a southbound left turn lane at FM 517 and a northbound left turn lane at Termini Street. Constructing medians would close off eastbound left turns exiting Termini Street. To solve this problem, it is recommended that the current signal at Termini Road be moved approximately 350 feet north to the Oak Park Street intersection and Austin Street be realigned to Oak Park Street. Austin Street would provide access to the post office, bank and all other businesses in the Termini Drive area and, would allow vehicles to exit going north on SH 3.

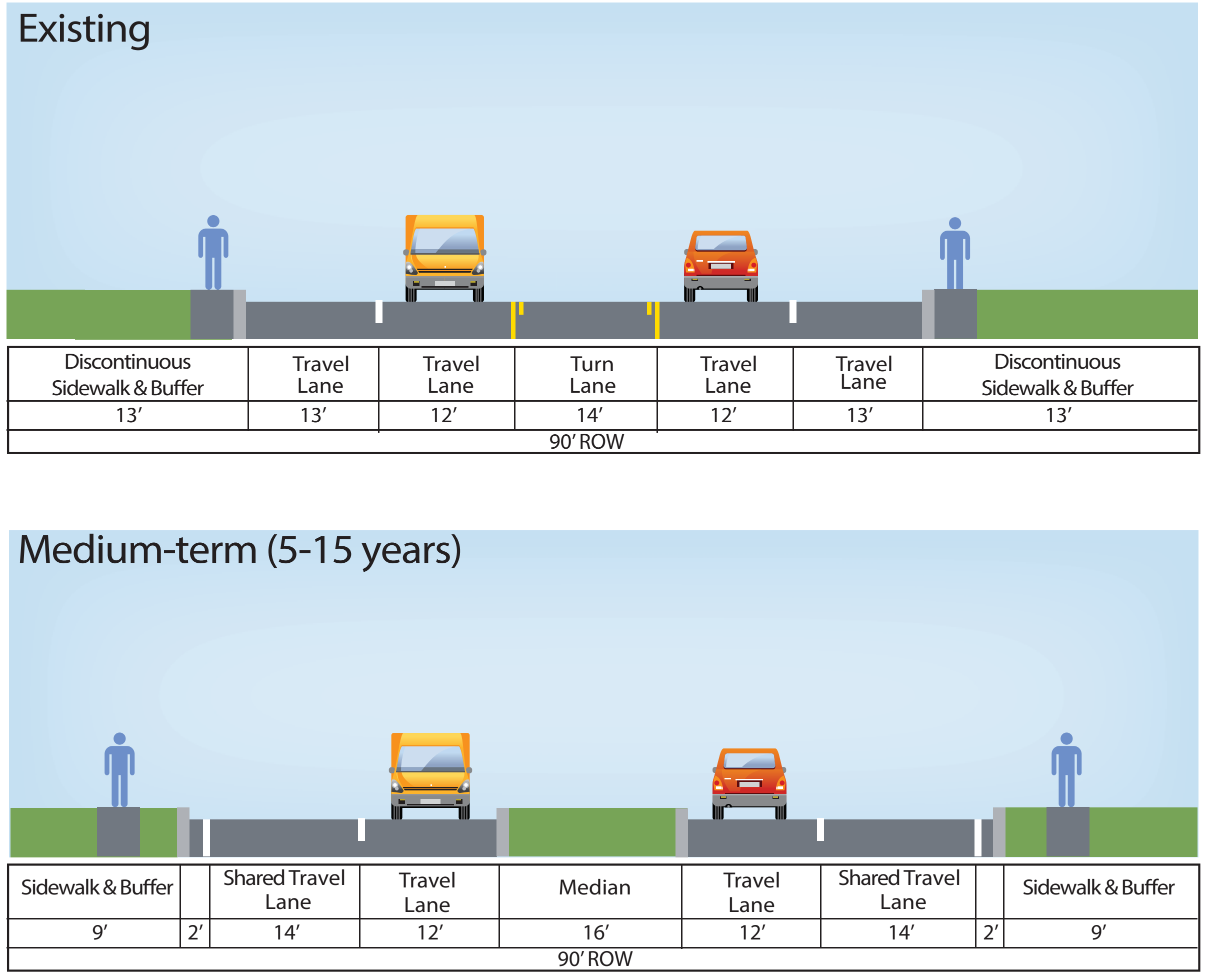


Figure 7-12: SH 3 - Hughes Drive to Deats Road

Figure 7-13: SH 3 - Hughes Drive to Deats Road

Long-term Improvements

FM 517

Roadway Segment Improvements. The two sections on the FM 517 corridor recommended for long term improvements include: Spruce Drive to Timber Drive, as shown in **Figure 7-14** and FM 1266 (Dickinson Avenue) to Gum Bayou, as shown in **Figure 7-15**. Based on the crash analysis, the section with the lowest crash rate is from Spruce Drive to Timber Drive. This section has a lower density of access points compared to the section just west of IH 45; the access points consist mostly of local collector streets and a few businesses, as shown in **Figure 7-16**. Therefore, the long-term recommendation for this section is to convert the two-way left turn lane to a raised median. Continuous sidewalks already exist along the length of this section. Similarly, it is also recommended to convert the two-way left turn lane in the section from Dickinson Avenue to Gum Bayou to a raised median, as shown in **Figure 7-17**. The long-term recommendation should be considered as redevelopment is planned and congestion increases.

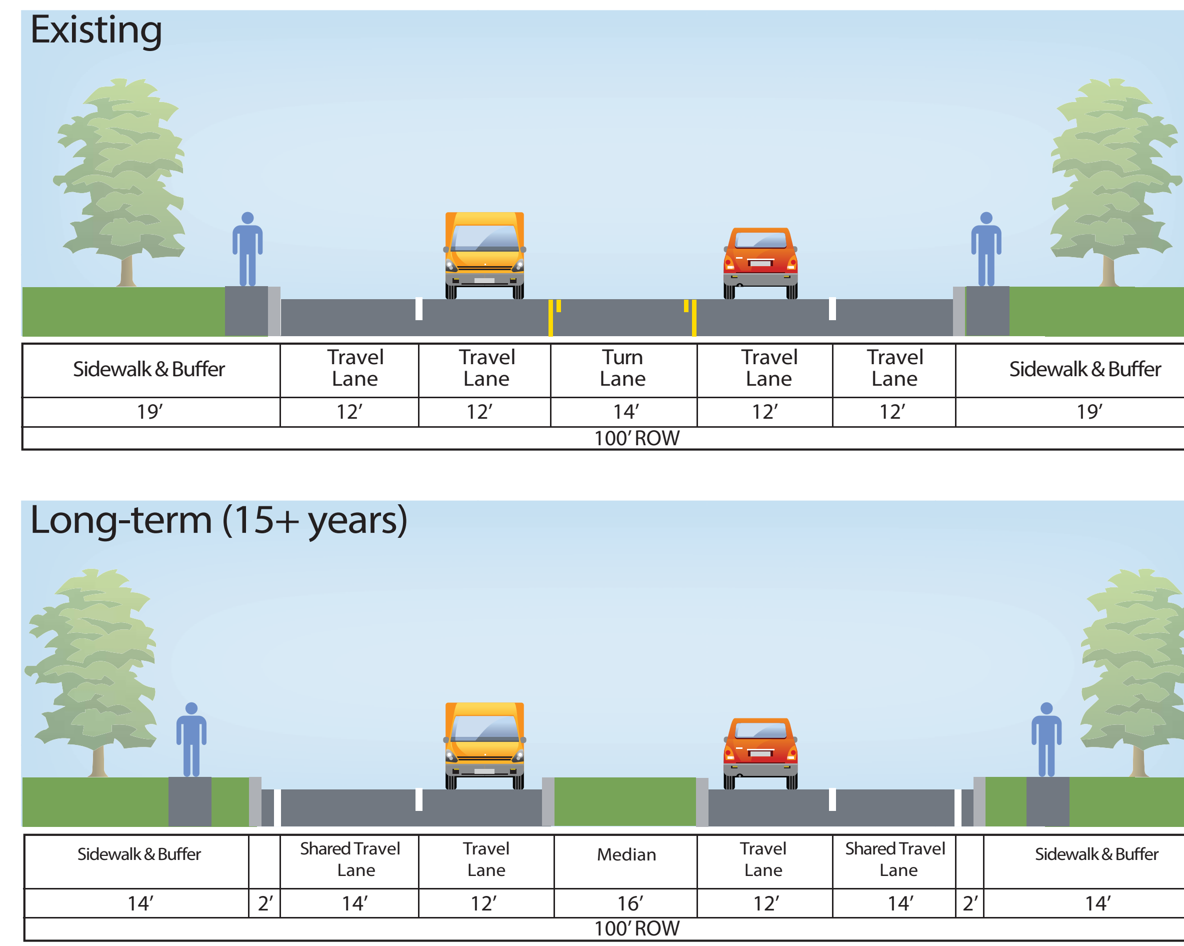


Figure 7-14: FM 517 - Spruce Drive to Timber Drive

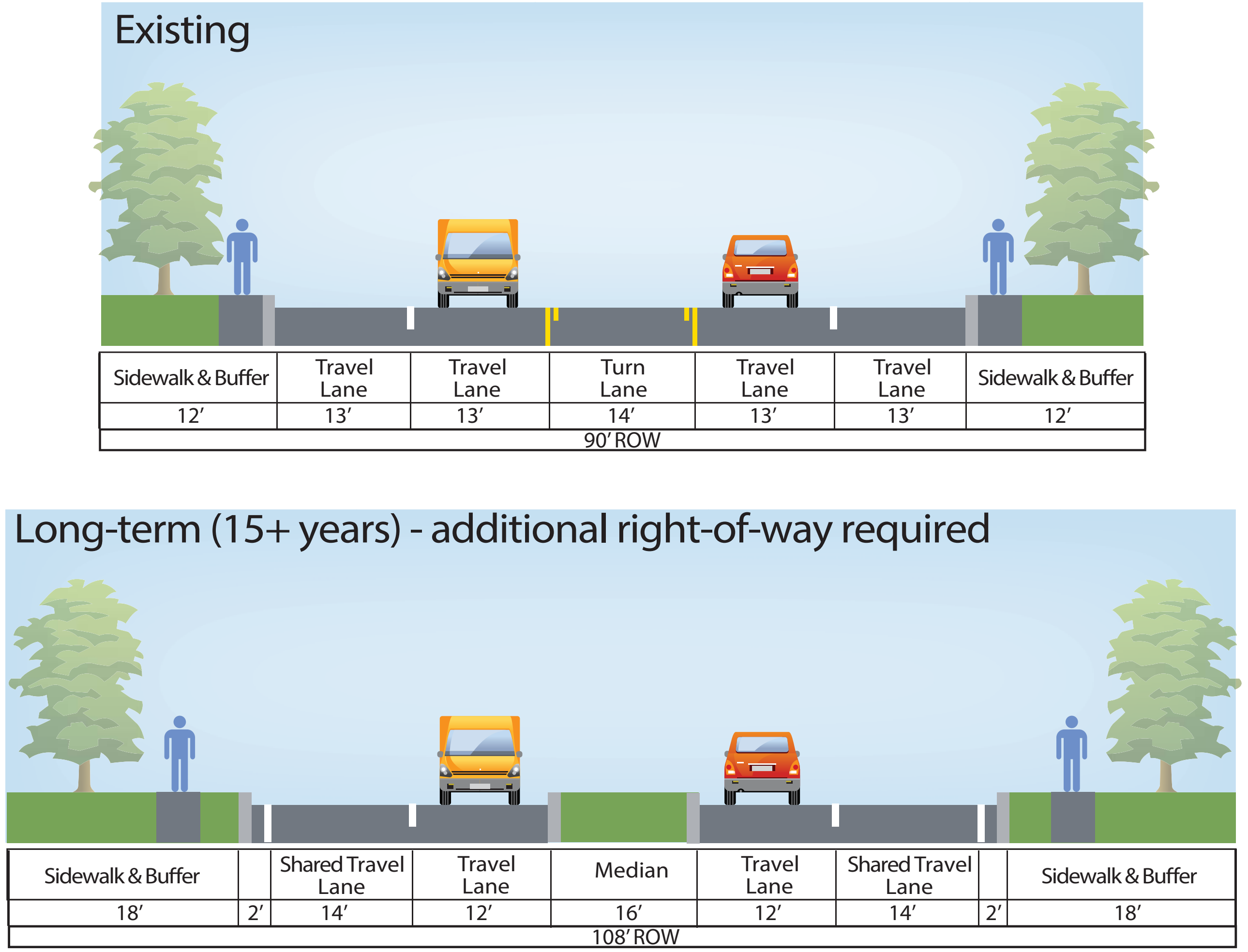


Figure 7-15: FM 517 - FM 1266 (Dickinson Avenue) to Gum Bayou

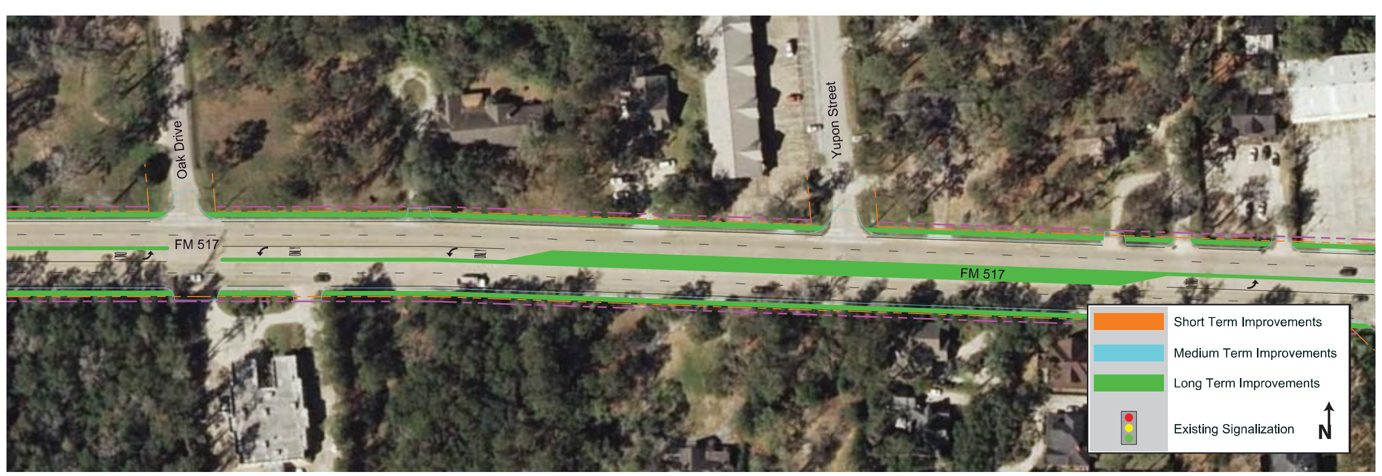


Figure 7-16: FM 517 - Spruce Drive to Timber Drive

Figure 7-17: FM 1266 (Dickinson Avenue) to Gum Bayou

For the section of FM 517 from SH 3 to FM 1266 (Dickinson Avenue), it is recommended that the improvements be implemented in the long-term for multiple reasons. The divided section just east of SH 3 presents a unique situation, and while the study team provides a number of alternative solutions, recommendations for this section will ultimately be based on future development.

One-way Pair Options:

East of SH 3 along FM 517 is a section of roadway with a unique formation: each direction splits apart, and then joins back together 1650 feet later. This one-way pair configuration has usable land between the two directions of roadway, currently containing a church and a yoga studio. There are also a few cross streets that cut through the one-way pair, as well as a railroad crossing. The current one-way pair has a few sharp curves and some poorly illuminated sections of the roadway, and is bordered by two major intersections.

There are multiple ways that the one-way pair could be modified to enhance the safety, aesthetics, and economic vitality of the area. One of the ways, shown in **Figure 7-18**, is to realign the eastbound portion of the one-way pair to be adjacent to the westbound portion, creating a similar roadway cross section to the nearby sections of FM 517. In this option, in order for some of the businesses along the eastbound direction to retain access to FM 517, the existing eastbound section would be converted into a smaller access road. This solution increases the mobility and safety of the area by eliminating some of the sharp curves that currently exist in the one-way pair. A railroad/roadway grade separation could be considered as part of the realignment option. While a grade separation option would improve mobility and safety, it would be very costly and significantly impact development opportunities.

Another possible modification to the area would be to place roundabouts at either end of the couplet: one on the west side at the intersection of Video Street, and one on the east side at the intersection of Dickinson Avenue, as shown in **Figure 7-19**. Roundabouts are an alternative to the traditional intersection model. They employ merging and diverging movements that funnel vehicles into a traffic circle that has multiple ingress and egress points. When analyzed and designed properly, this intersection configuration allows for continuously flowing traffic compared to stop or signal controlled intersections, roundabouts also increase safety by decreasing the likelihood of side and head-on crashes. Roundabouts can increase the safety of intersections with crash-prone geometry, such as the intersection of FM 517 and FM 1266. Also, roundabouts can serve as an option for a landmark feature of an urban, pedestrian friendly area. Because of the circular design, there are opportunities for landscaping or other aesthetic elements to be placed within the middle of the roundabout. Roundabouts can also help to slow the overall speed of traffic through a section of roadway. These slower speeds can encourage drivers to eat or shop in the area, which increases the economic activity of the city. This solution would create an area that encourages pedestrian traffic, business growth, and could attract trips to the area increasing the economic opportunity for the region. Ultimately, the geometric alternative must be evaluated as redevelopment plans for this area are formed.

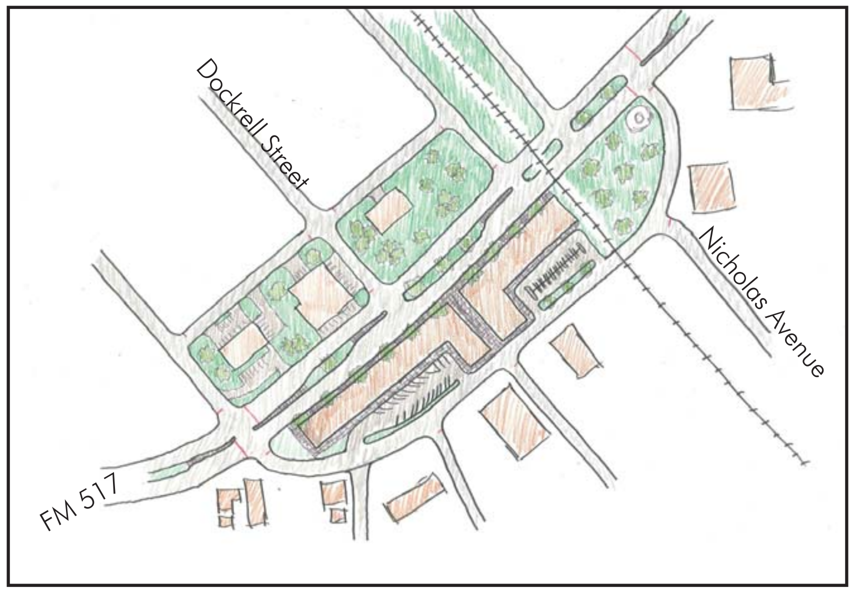


Figure 7-18: One-way pair realigned with business access road

Figure 7-19: Roundabout Alternative

IH 45 Reconstruction. Additional mainlane capacity as well as ramping improvements are planned for the IH 45 corridor. The schematic has not been finalized nor has funding been identified for construction. However, the ramping scheme at FM 517 will change such that the ramps serving the interchange will be reversed. For instance the northbound entrance from FM 517 will be the future location of the northbound exit to FM 646. This type of ramp configuration, commonly referred to as an X-pattern, better serves frontage road development and relieves intersection congestion. According to the Regional Transportation Plan, these IH 45 improvements are not scheduled for implementation before 2032.

Intersection Improvements. Located west of Timber Drive, Cedar Drive and Fatta Drive are offset collection streets. Cedar Drive which stems from the north side is just east of a small strip center containing a church and a restaurant. Across from this strip center, approximately 120 feet west of Cedar Drive is Fatta Drive which stems south and provides access to a number of businesses and residences. It is recommended that the approach for Cedar Drive is realigned 120 feet to the west so that Fatta Drive and Cedar Drive line up with each other, as shown in **Figure 7-20**. This realignment will require ROW acquisition from the strip center parking lot, but will improve the connectivity of the side street network.

Figure 7-20: Fatta Drive and Cedar Drive alignment

Table 7-3 describes the recommended intersection improvements. Based on an operational analysis of existing and future traffic, it is recommended that the California Avenue (**Figure 7-21**) north and southbound approaches provide an exclusive left turn lane and a shared through-right lane. At FM 1266 (Dickinson Avenue), it is recommended that the southbound right turn bay storage length will be extended for the Dickinson Avenue intersection (**Figure 7-22**). A traffic signal upgrade to pole and mast arm construction for the intersections along FM 517 of Maple Drive, Owens Drive, and Texas Avenue are recommended when the long-term roadway segment improvements are constructed. The installation of a new traffic signal is recommended for the Baker Drive intersection.

Table 7-3: Recommended Intersection Improvements	
Baker Drive	Install traffic signal (warrant required)
California Avenue	Convert northbound and southbound shared left-thru-right lanes to an exclusive left turn lane and a shared thru-right lane
Dickinson Avenue	Add storage to the southbound right turn bay
Maple Drive	Upgrade traffic signal to pole and mast arm when roadway segment improvements are done.
Owens Drive	Upgrade traffic signal to pole and mast arm when roadway segment improvements are done.
Texas Avenue	Upgrade traffic signal to pole and mast arm when roadway segment improvements are done.

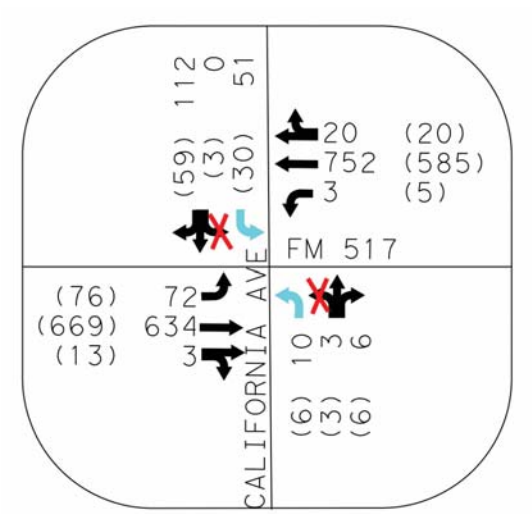


Figure 7-21: AM (PM) Peak Hour Volumes for FM 517 and California Avenue

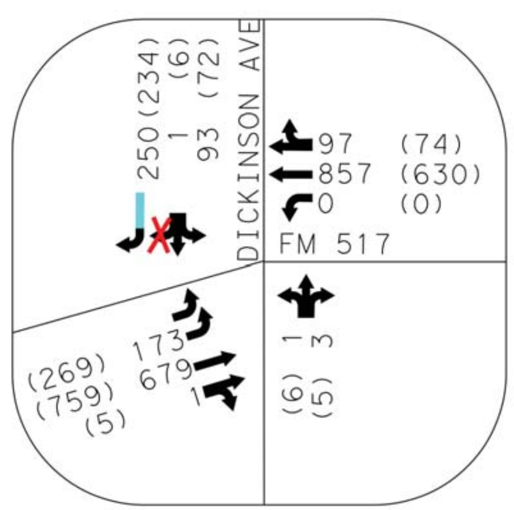


Figure 7-22: AM (PM) Peak Hour Volumes for FM 517 and Dickinson Avenue

SH 3

Roadway Segment Improvements. Along SH 3, from Deats Road to 20th Street, there is a short section within Dickinson city limits that is recommended for long-term improvements, as shown in **Figure 7-23**. The improvement consists of converting the two-way left turn lane into a raised median, with continuous sidewalks bordering the section, as shown in **Figure 7-24**. The long term recommendations should be considered as redevelopment occurs and congestion increases. **Design details and preliminary cost estimates are provided in the Appendix.**

Figure 7-23: Deats Road to 20th Street

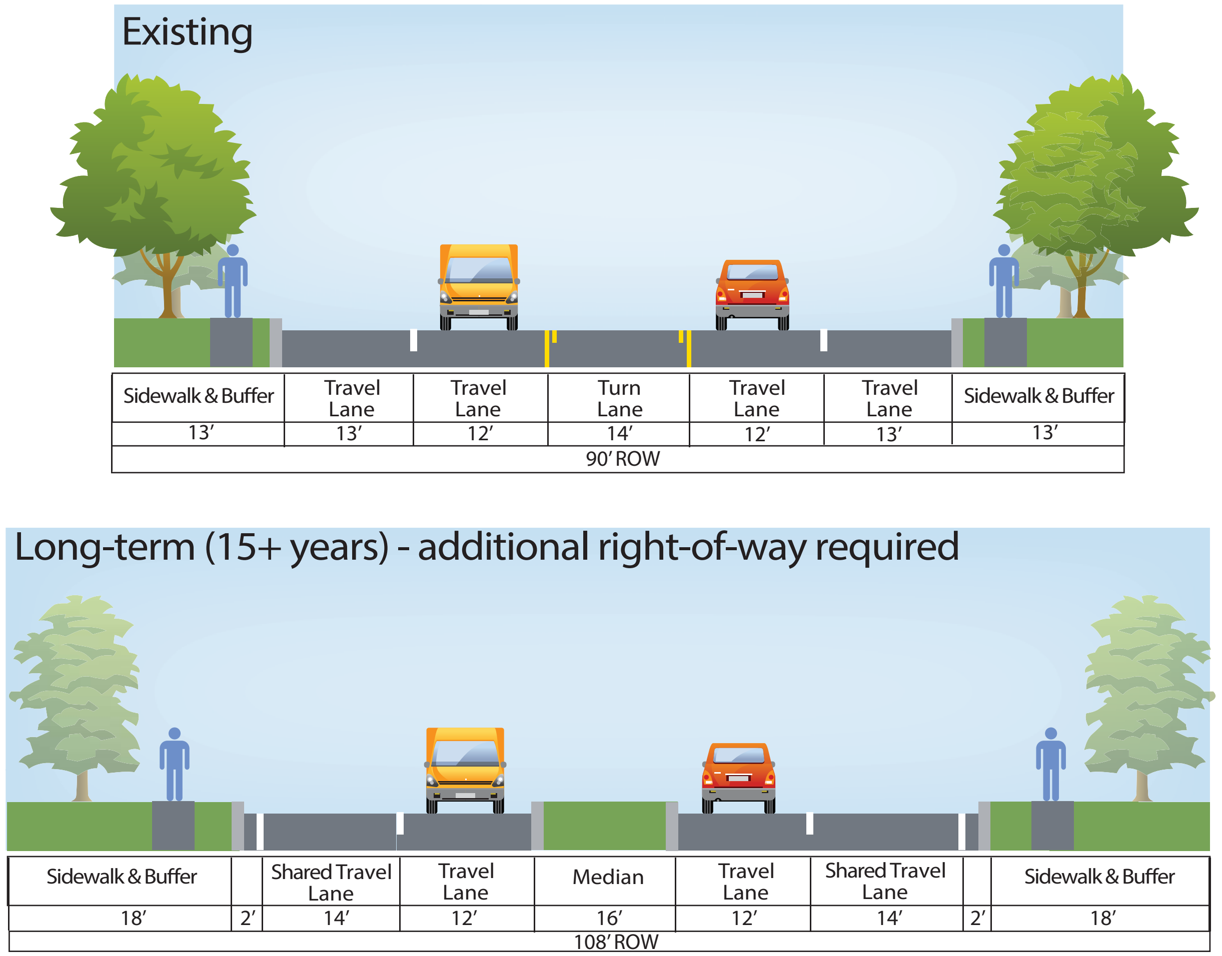


Figure 7-24: SH 3 - Deats Road to 20th Street

7.3 CITY OF LEAGUE CITY IMPLEMENTATION

City of League City jurisdictional boundaries cover areas of both corridors (see **Figure 7-2** on page 42). While TxDOT maintains the corridors, the City of League City maintains the cross streets. The TxDOT ROW within League City city limits is FM 517 from Cemetery Road to Borden Gully Drive and the section of SH 3 from 18th Street (just south of FM 646) to the northern project limits of SH 3 at FM 518. The improvements in these sections include short-, medium-, and long-range summaries for each improvement on FM 517 and SH 3. **Design details and preliminary cost estimates are included in the Appendix.**

Short-term Improvements

Traffic Signal Improvements. Improved signal timing and traffic signal infrastructure improvements can have a significantly positive impact on the safety and mobility of a corridor. Traffic signal coordination occurs when two or more adjacent intersection traffic signal controllers are programmed such that a platoon of vehicles can progress smoothly though the set of intersections without stopping. For this to occur, the controller programming must account for parameters such as vehicle speed and distance between intersections. Additionally, the traffic signal controllers must maintain the same time clock so that the intersections do not become "out of step" with each other, which can cause poor signal coordination. Coordination can occur for these corridors by several methods, including but not limited to time-based coordination or closed-loop system.

League City maintains and operates all traffic signals within their jurisdiction. As mentioned previously, signal timing and coordination will be a powerful tool used to improve traffic conditions within the City of League City. All traffic signals will receive timing improvements, and traffic signals that are close enough to each other to where coordination can be effective will be coordinated. For SH 3 between Walker Street and FM 518, signals are spaced closely enough to where it is feasible to coordinate the signals. For the section of FM 517 that is within League City city limits, Cemetery Road and FM 646 are not close enough to coordinate.

FM 517

No short term improvements are recommended for the sections of FM 517 within the City of League City.

SH 3

Roadway Segment Improvements. Based on the crash data, the area most in need of improvements is along SH 3 from Walker Street to FM 518. Due to the high number of driveways and side streets, the two-way left turn lane allows for a large number of conflicting movements. It is recommended that a raised median replace the two-way left turn lane and that sidewalks be constructed to fill in the current gaps in pedestrian facilities.

One specific area of interest is Galveston Street, located approximately 300 feet south of the FM 518 and SH 3 intersection. Galveston Street provides back-door access to a large strip center west of SH 3, a post office, and other businesses. Therefore, it is recommended that northbound vehicles retain the ability to turn left onto Galveston Street. If medians were constructed from FM 518 to Galveston Street, there would not be sufficient storage for the single lane of the northbound left turn bay at FM 518. It is also recommended that the northbound left turn bay at FM 518 be striped (as shown in **Figure 7-25)** for the short-term. From Walker Street to Galveston Street, the two-way left-turn lane will be converted to a raised median as shown in **Figure 7-26**. Further expansion of this area will be recommended for the medium-term solutions. **Design details and preliminary cost estimates are provided in the Appendix.**

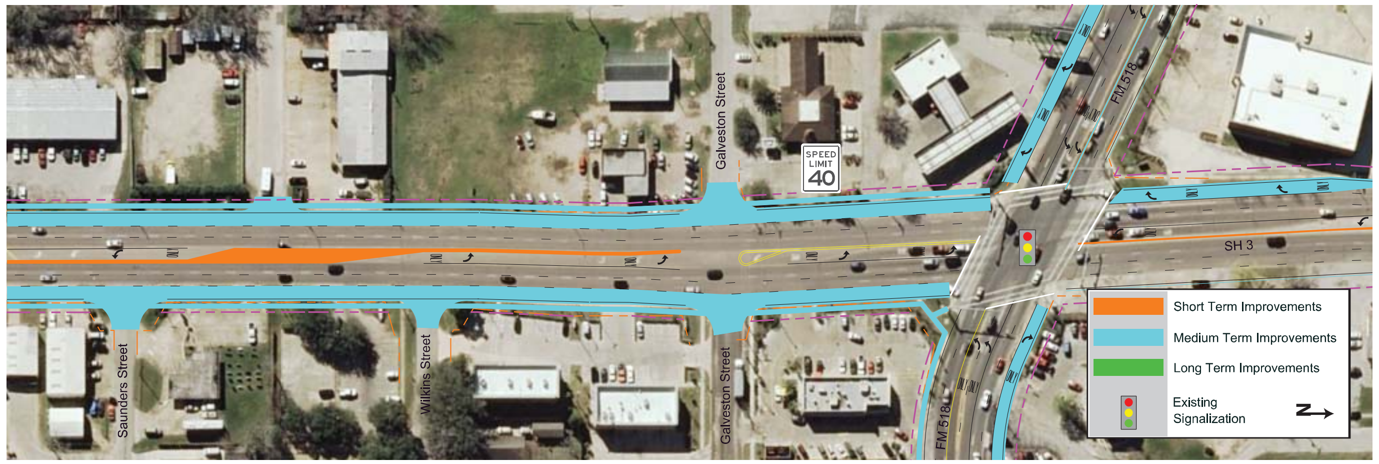
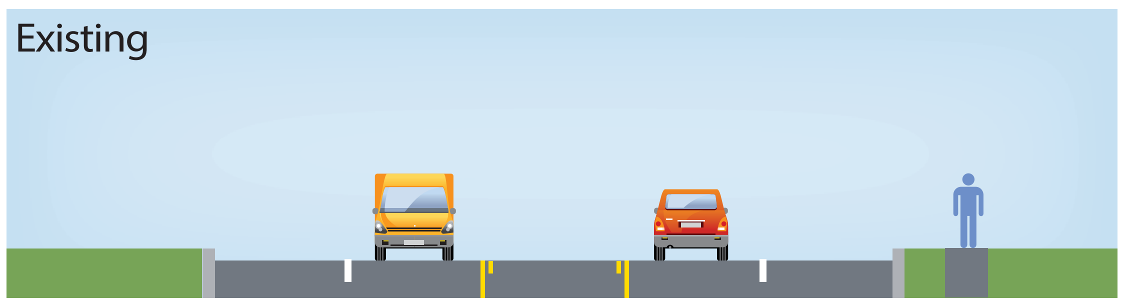
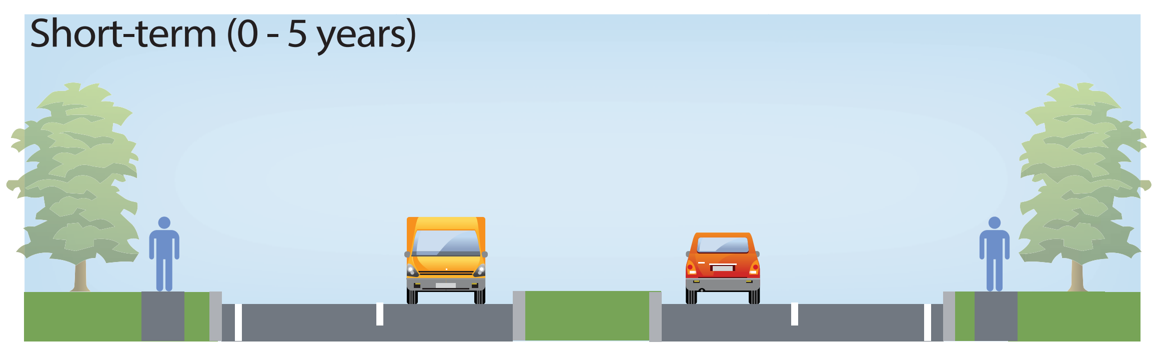


Figure 7-25: SH 3 - Walker Street to FM 518



Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
17'	14'	12'	16'	12'	14'	20'
105' ROW						



Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	18'
105' ROW								

Figure 7-26: SH 3 - Walker Street to FM 518

A grade separation for SH 96 over SH 3 is planned. This project has already been approved and is currently planned by TxDOT for the 2018 Transportation Improvement Plan (TIP). As will be discussed later in this report, that section of SH 3 is recommended to be improved in the long-term, so construction on the two projects are not likely to overlap.

Intersection Improvements. For SH 96 (League City Parkway), it is recommended that the lanes be reconfigured. For both the eastbound and westbound directions, exclusive right turns bays will be added, and the current shared thru-right lanes will be exclusively thru lanes as shown in **Figures 7-27** and **7-28**. This reconfiguration will increase throughput at the intersection and will relieve congestion until the grade separation is constructed.

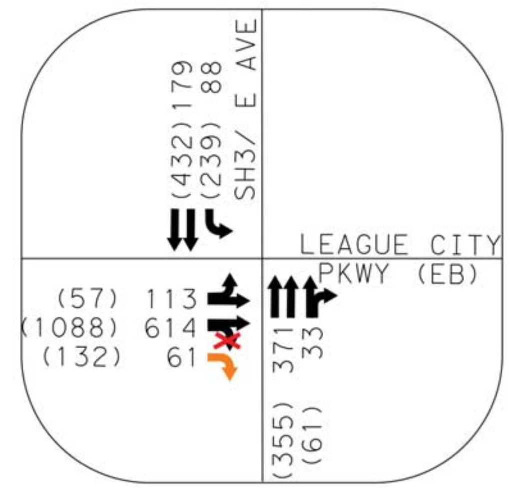


Figure 7-27 AM (PM) Peak Hour Volumes for SH 3 and SH 96 eastbound

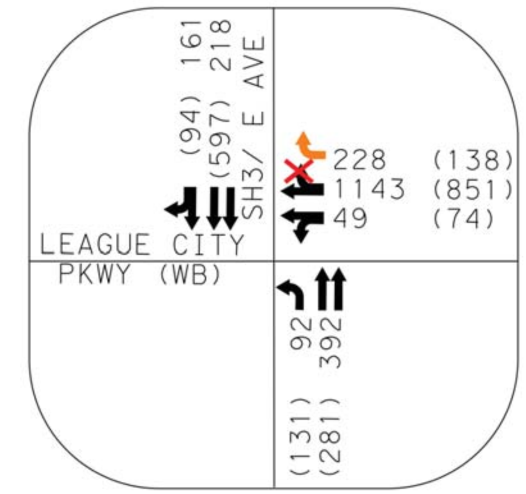


Figure 7-28: AM (PM) Peak Hour Volumes for SH 3 and SH 96 westbound

Medium-term Improvements

FM 517

Roadway Segment Improvements. Beginning on the western limits of FM 517, from Cemetery Road to FM 646, pavement widening is recommended to accommodate an additional through lane in each direction, along with a continuous raised median, as shown in **Figure 7-29**. Continuous sidewalks will also be constructed for this area, as there are many current and planned residential developments nearby, as shown in **Figure 7-30**.

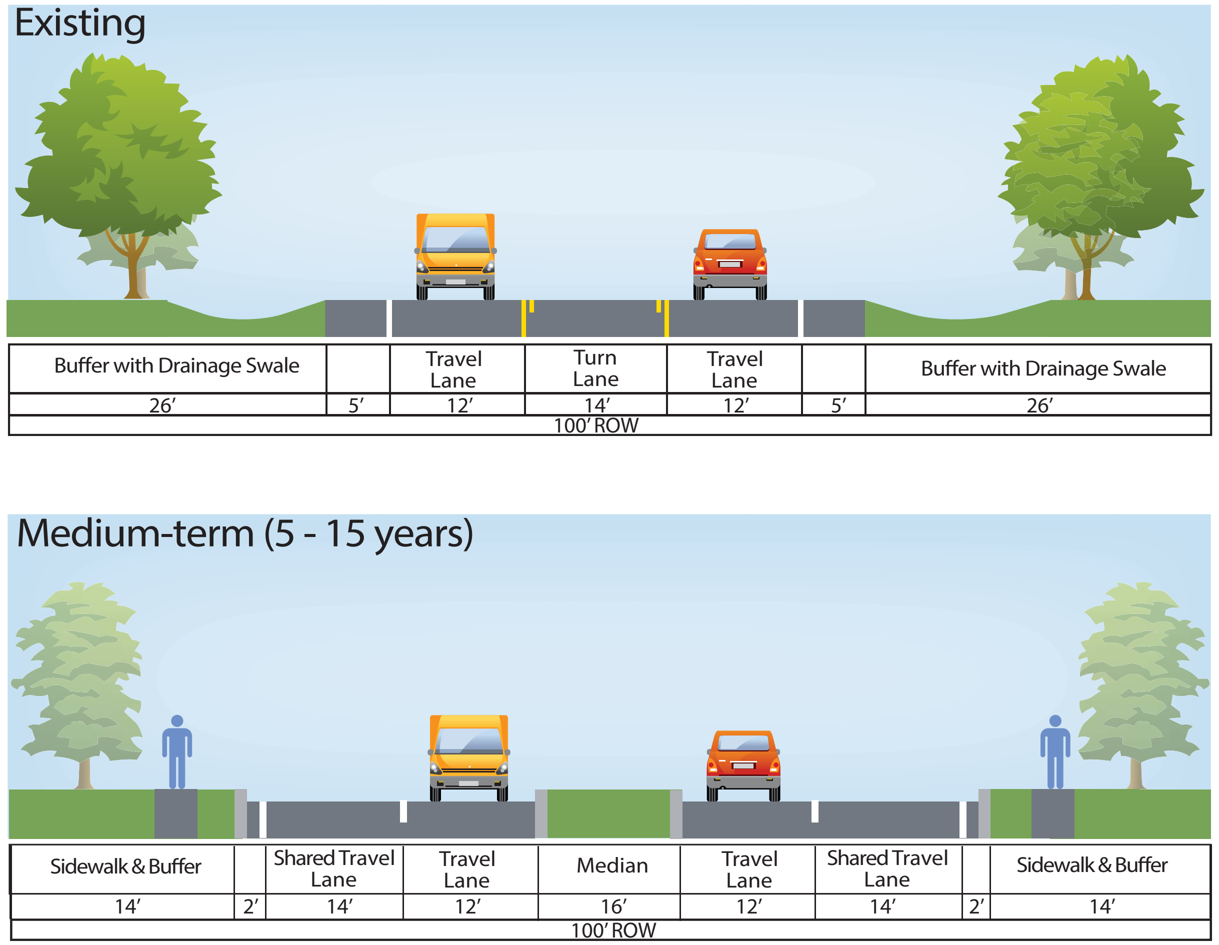


Figure 7-29: FM 517 - Cemetery Road to FM 646

Figure 7-30: FM 517 - Cemetery Road to FM 646

From FM 646 to Borden Gully Drive, the FM 517 pavement widening is recommended to accommodate an additional through lane in each direction (6 lanes total), as shown in **Figure 7-31** and **Figure 7-32**. ROW acquisition will be required to do this widening. There are some stretches of existing sidewalks that border this section of FM 517; continuous sidewalks would be constructed to fill in the gaps.

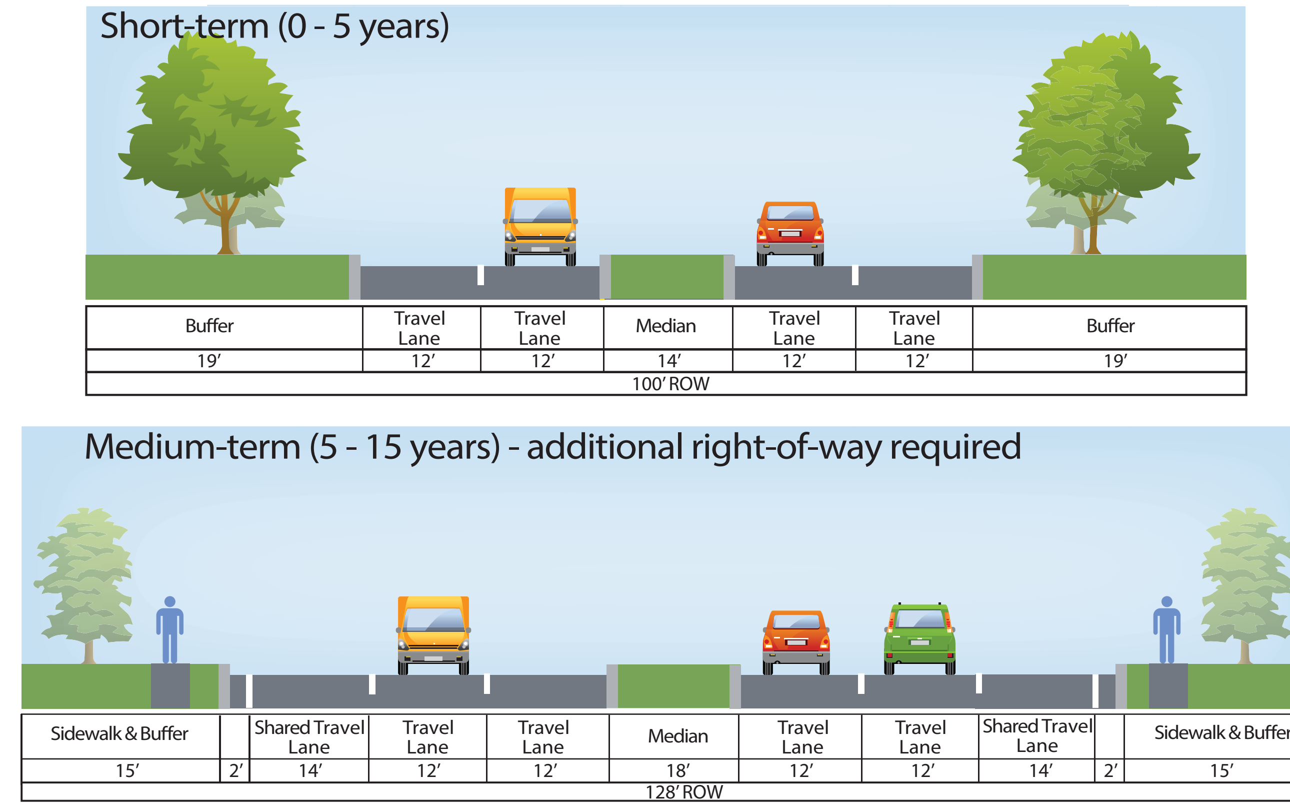


Figure 7-31: FM 517 - FM 646 to Borden Gully Drive

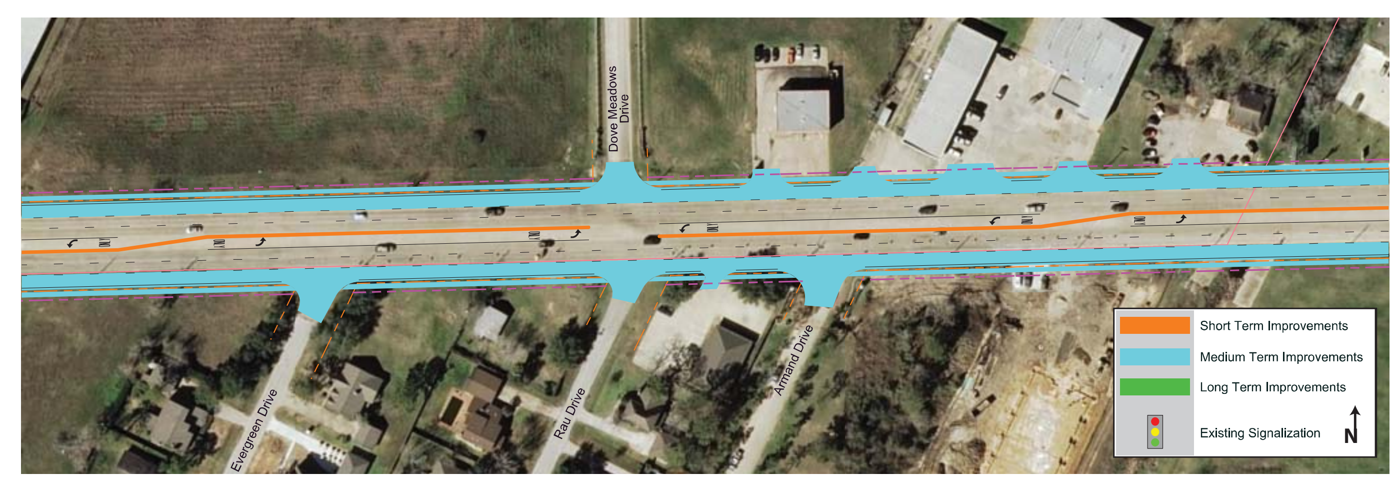


Figure 7-32: FM 646 to Borden Gully Drive

Intersection Improvements. **Table 7-4** describes the recommended medium-term intersection improvements. Based on an operational analysis of existing and future traffic, it is recommended that additional right turn storage is provided for the FM 646 intersection (**Figure 7-33**). A traffic signal upgrade to pole and mast arm construction for the intersection along FM 517 at Cemetery Road was recommended when the medium term roadway segment improvements are constructed.

Table 7-4: Intersection Improvements	
Cemetery Road	Upgrade traffic signal to pole and mast arm construction
FM 646	Add storage to the westbound and eastbound right turn bays

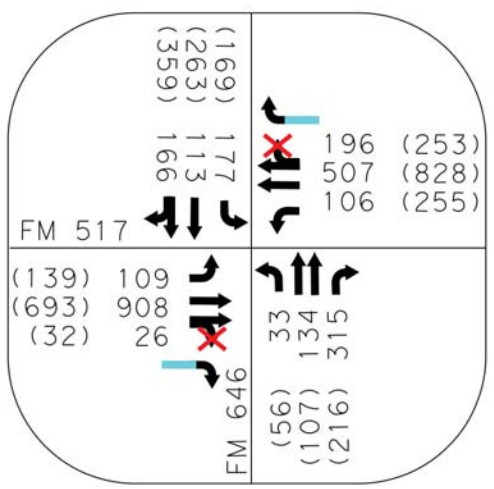


Figure 7-33: AM (PM) Peak Hour Volumes for FM 517 and FM 646

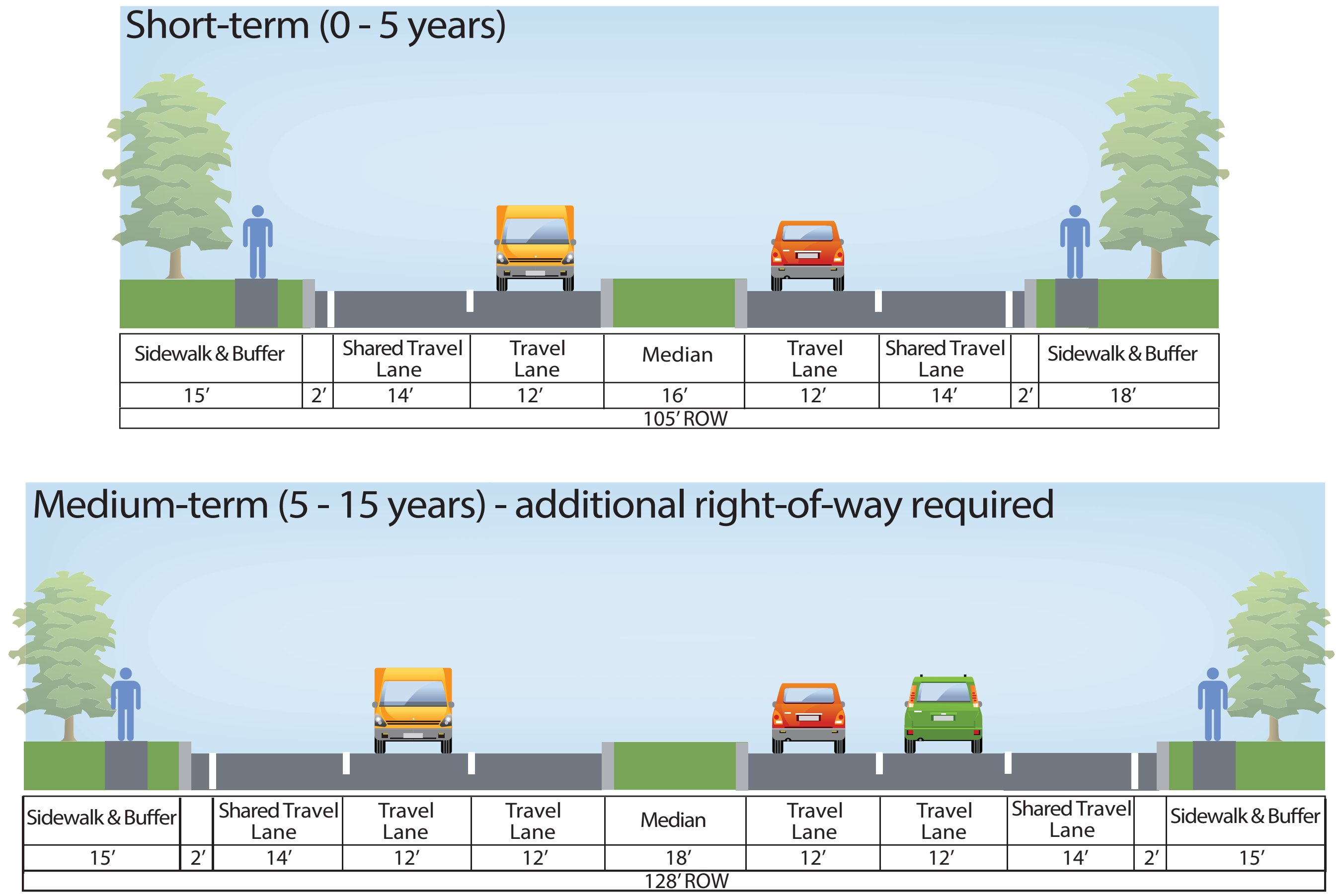


Figure 7-34: SH 3 - Walker to FM 518

SH 3

On SH 3 from Walker Street to FM 518, additional roadway improvements are recommended. The current section will be converted to a 6-lane section, as shown in **Figures 7-34 and 7-35**. This improvement will require ROW acquisition. In order to continue to allow northbound vehicles to access Galveston Street via left turns, a hooded left turn bay will be provided that allows left turns from FM 518 onto Galveston Street, but not left turns from Galveston Street onto FM 518. The addition of dual left turns for the northbound approach to the FM 518 intersection, as shown in **Figure 7-35**, allows for the capacity to add medians and the hooded left at Galveston Street. These recommendations aim to provide additional capacity for the congested area, and to create a safer environment by eliminating the many possible left turns across opposing traffic. **Design details and preliminary cost estimates are provided in the Appendix.**

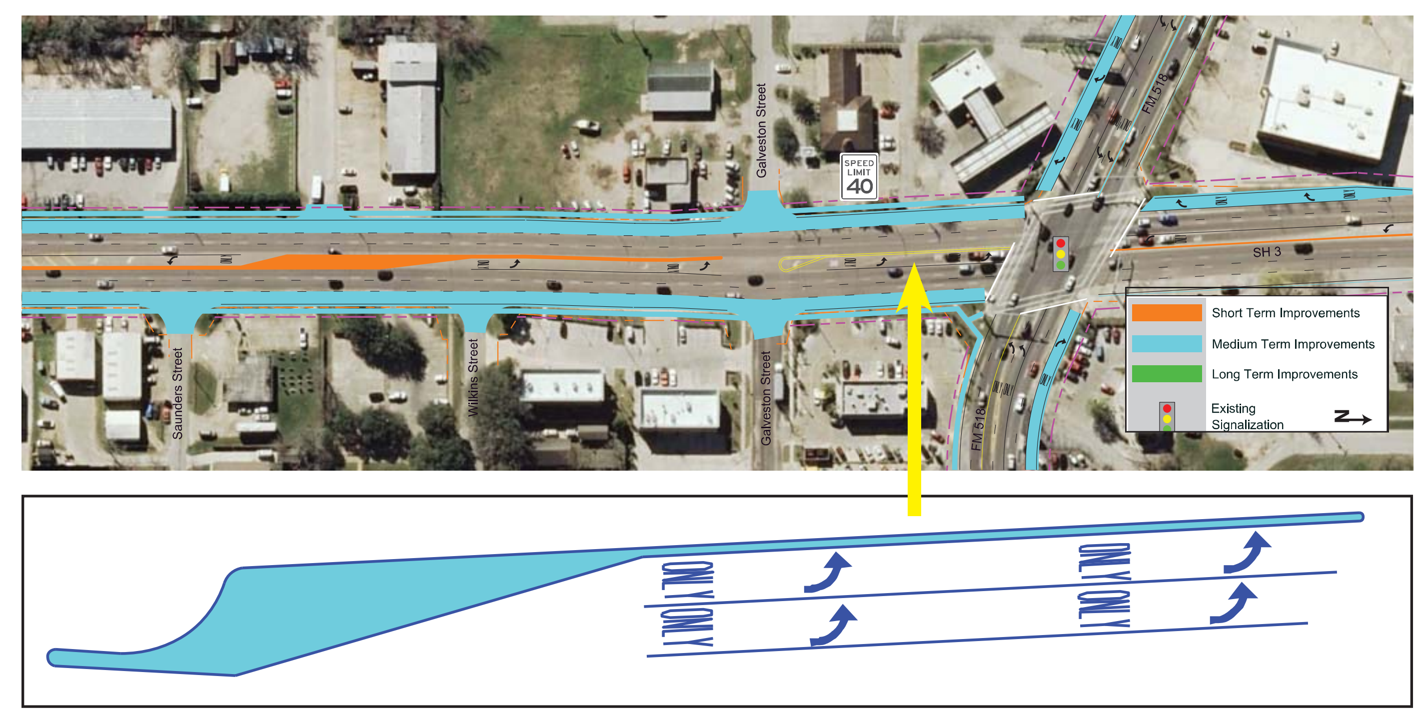


Figure 7-35: SH 3 - Walker Street to FM 518

Intersection Improvements. Based on an operational analysis of existing and future traffic, it is recommended that additional left turn capacity is provided for the FM 518 intersection. This will require widening pavement to provide dual left turn lanes for all approaches. Based on the traffic volumes, it is also recommended to construct right turn bays for east and westbound approaches, as shown in **Figure 7-36**.

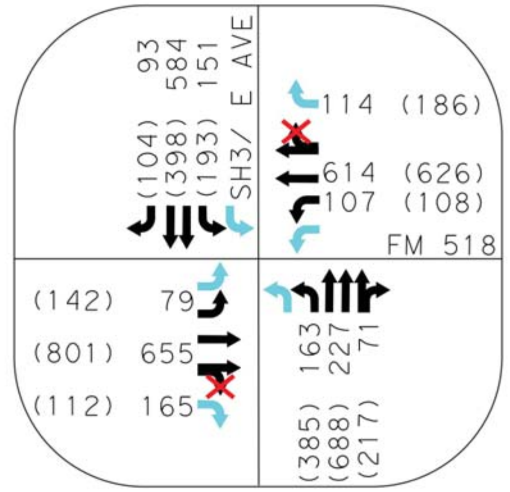


Figure 7-36: AM (PM) Peak Hour Volumes for SH 3 and FM 518

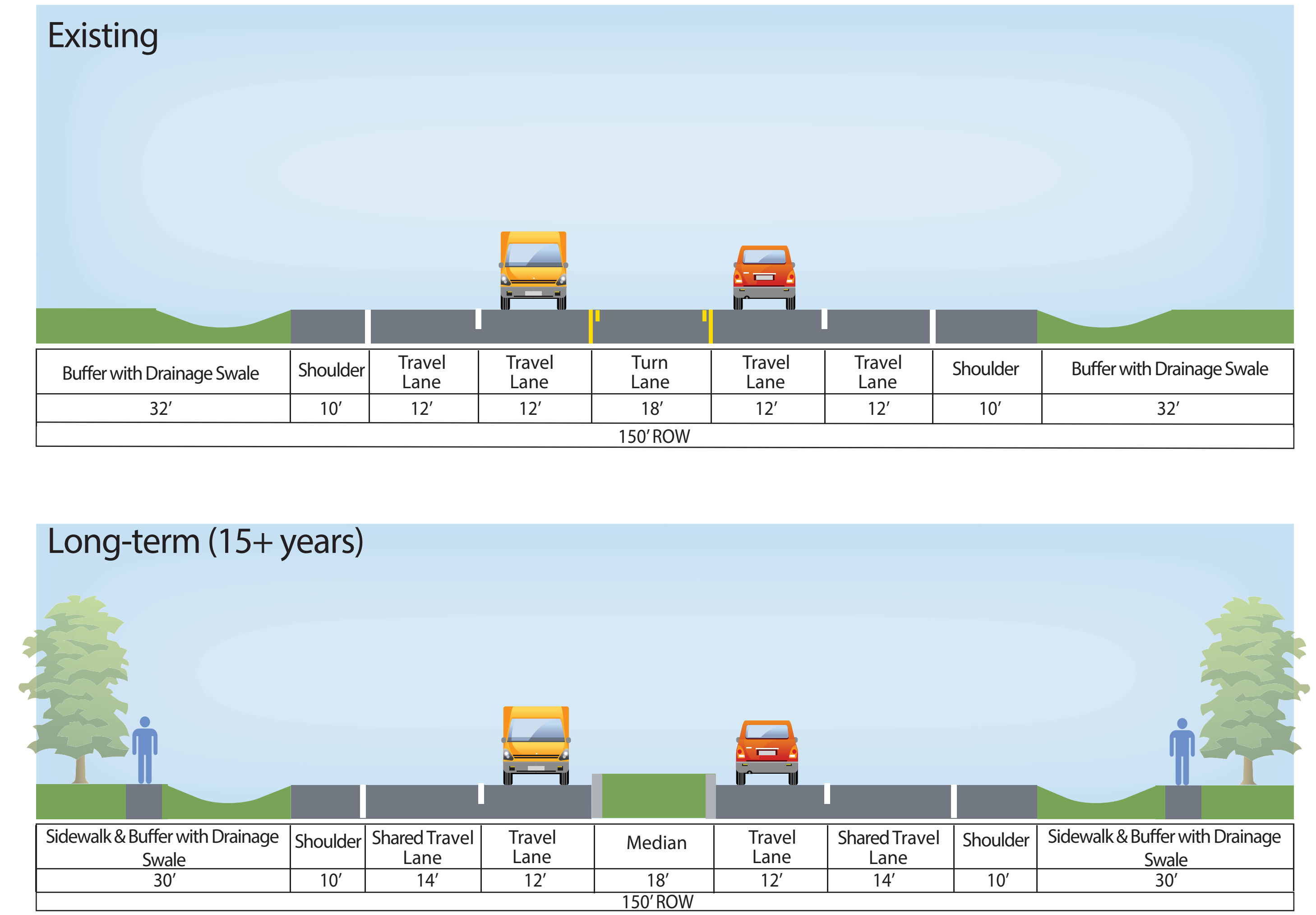


Figure 7-37: SH 3 - 18th Street to SH 96

Long-term Improvements

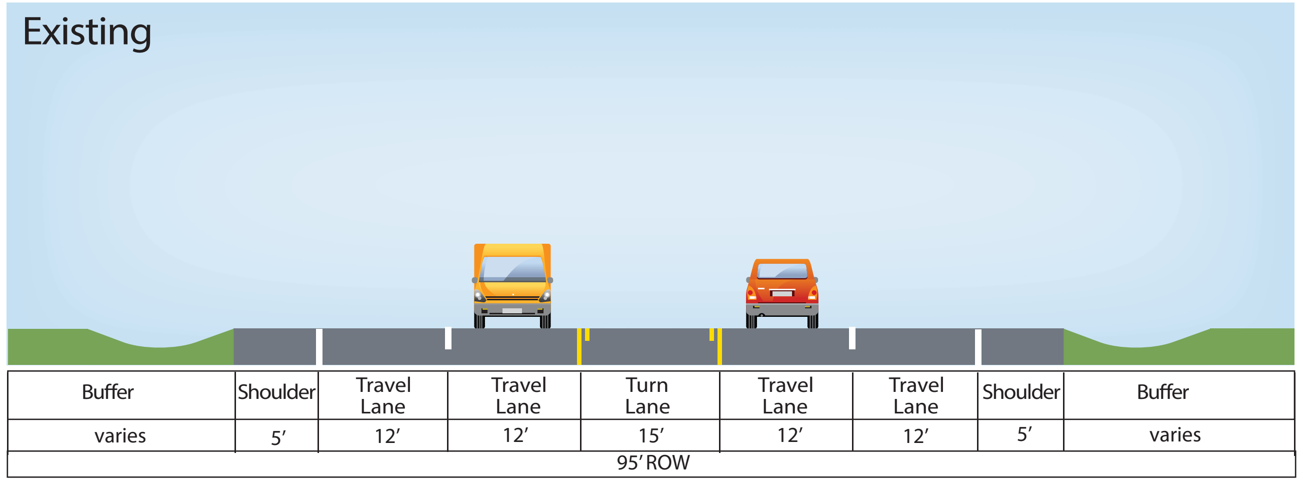
FM 517

No long term improvements are recommended along FM 517 within the City of League City.

SH 3

Roadway Segment Improvements. The section along SH 3 from 18th Street to Walker Street is viewed as one of the least critical areas of the SH 3 corridor. It is recommended that the two-way left turn lane be converted to a standard raised median, with continuous sidewalks, as shown in **Figures 7-37** and **7-38**. This area has a low driveway density and good street connectivity so medians will have a much lower impact on any access restriction issues. A short segment of this section is shown in **Figure 7-39**. Long term recommendations should be considered as redevelopment is planned and congestion increases. **Design details and cost estimates are provided in the Appendix.**

FM 646 is planned to be grade separated over both SH 3 and the railroad. While there is no specific time table for this improvement, TxDOT has identified this project as a need for the area.



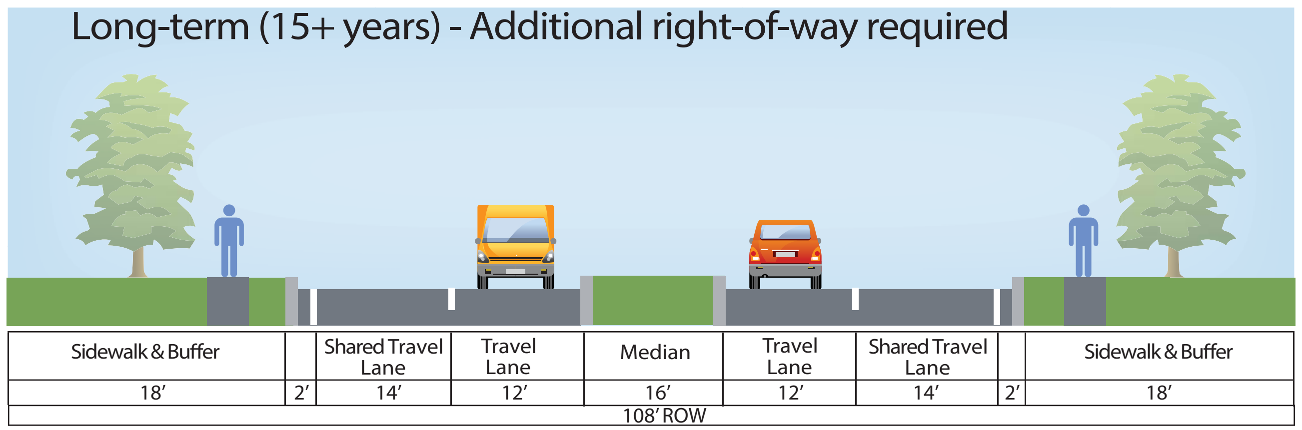


Figure 7-38: SH 3 - SH 96 to Walker Street

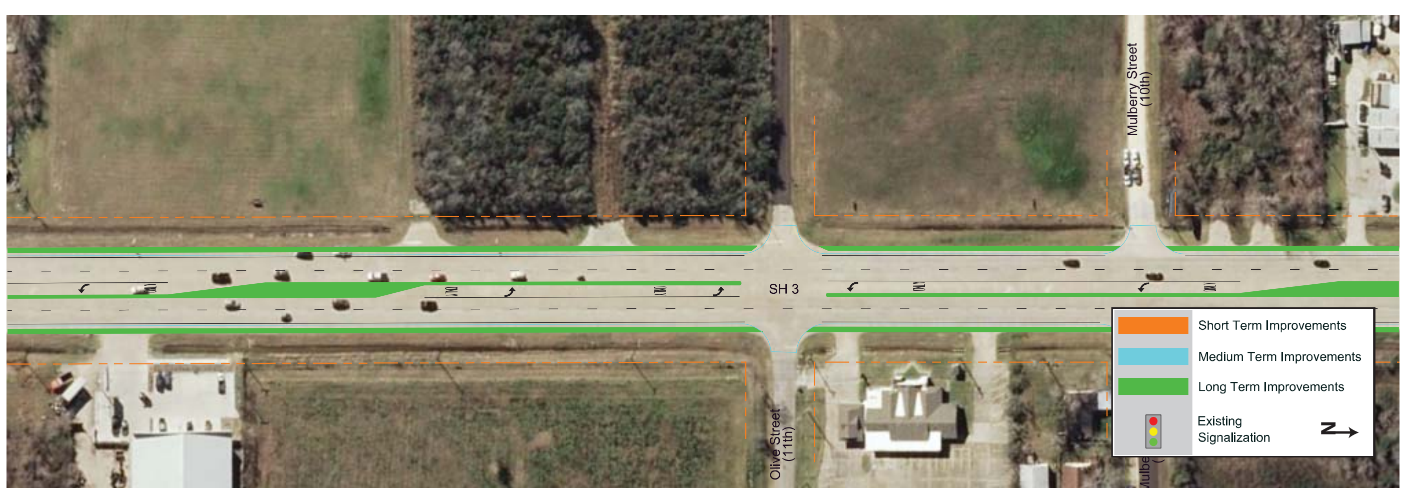


Figure 7-39: SH 3 - 18th Street to Walker Street

7.4 GALVESTON COUNTY IMPLEMENTATION

Galveston County jurisdictional boundaries cover two blocks of SH 3 from 20th Street to 18th Street land south of FM 517 from Cemetery Road to Shoreview Drive.

FM 517

It is recommended that the short section of FM 517 adjacent to Galveston County limits (Cemetery Road to Shoreview Drive) match the section described in the Dickinson city limits section: add a through lane in each direction and convert the two-way left turn lane to a raised median, as shown in **Figure 7-30**. Continuous sidewalks will be constructed to increase pedestrian safety.

SH 3

It is recommended that the short section of SH 3 contained within Galveston County limits match the section to the north that is within League City city limits, as shown in **Figure 7-37**. It is recommended in the long-term that the current two-way left turn lane be converted to a raised median with continuous sidewalks.

7.5 PROJECT COSTS

The projected costs for the short-, medium- and long-term improvements are presented in **Figures 7-40** and **7-41** on the following pages. It is noted that both corridors are maintained by TxDOT and therefore, the design and construction of the roadway segment would be the responsibility of TxDOT. However, costs such cross street improvements and aesthetics costs would be the responsibility of the other jurisdictions.

Table 7-5: FM 517 Conceptual Improvements and Projected Costs

		FM 517 Access Management Plan Conceptual Improvements						
		Responsible Agency	TxDOT		City of Dickinson		City of League City	
		Location	Improvement	Costs	Improvement	Cost	Improvement	Cost
Short Range (0-5 years)	General	All signalized intersections	Signal timing coordination (Closed loop system or install GPS clocks)	$50,000 - $100,000				
		City of Dickinson			Develop Master Thoroughfare Plan to improve planned street connectivity and spacing. Thoroughfare Plan to be used for communication internally as well as to existing property owners and future developers.	$20,000		
	Intersection	Hughes Lane	Traffic signal (warrant required by TxDOT)	$150,000				
	Segment	FM 646 to Spruce Drive	Construct raised median and within existing pavement	$1,130,000				
		TOTAL FOR SHORT-TERM IMPROVEMENTS		$1,380,000		$20,000		$0
Medium Range (5-15 years)	Intersection	Cemetery Rd	Upgrade traffic signal to pole and mast arm	$150,000				
		FM 646	Extend EB and WB right turn storage lanes	$76,000				
		Fire Station west of IH 45	Upgrade traffic signal to pole and mast arm	$150,000				
		IH 45	Extend EB and WB right turn storage lanes	$76,000				
		Timber Dr	Upgrade traffic signal to pole and mast arm	$150,000				
		SH 3	Add NB and SB right turn storage. Upgrade traffic signal to pole and mast arm.	$226,000				
		FM 1266 (Dickinson Ave)	Add exclusive SB right turn lane. Upgrade traffic signal to pole and mast arm.	$190,000				
		California St	Add exclusive NB and SB left turn lane. Upgrade traffic signal to pole and mast arm.	$226,000				
	Segment	Cemetery Rd to FM 646	4-lane with raised median and continuous sidewalks	$6,600,000			Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000
		FM 646 to Spruce Dr	6-lanes with raised median and continuous sidewalks	$5,800,000	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
		Timber Dr to SH 3	4-lane with raised median and continuous sidewalks	$1,100,000	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
		TOTAL FOR MEDIUM-TERM IMPROVEMENTS		$14,744,000		$60,000		$30,000
Long Range (15 + years)	Intersection	Maple Dr	Upgrade traffic signal to pole and mast arm	$150,000				
		Cedar Dr			Potential intersection realignment with Fatta Dr (dependent on long-term development)	TBD		
		Texas Ave	Upgrade traffic signal to pole and mast arm	$150,000				
		Baker Drive	Traffic signal (warrant required by TxDOT)	$150,000				
		Owens Dr	Upgrade traffic signal to pole and mast arm	$150,000				
		IH 45 NB and SB Ramps	As part of planned reconstruction, reverse SB and NB ramps serving FM 517	$358,597,297 (Per TIP, total construction between North of FM 1764 to North of FM 517. **Not included in total.**)				
	Segment	Spruce Dr to Timber Dr	4-lane with raised median and continuous sidewalks	$4,400,000	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
		SH 3 to FM 1266 (Dickinson Ave)	Alignment based on future development plans	TBD	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
		FM 1266 (Dickinson Ave) to Gum Bayou	4-lane with raised median and continuous sidewalks	$4,700,000	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
		TOTAL FOR LONG-TERM IMPROVEMENTS		$9,700,000		$90,000		$0
GRAND TOTAL				$25,824,000		$170,000		$30,000

Table 7-6: SH 3 Conceptual Improvements and Projected Costs

			SH 3 Access Management Plan Conceptual Improvements							
		Responsible Agency	TxDOT		City of Dickinson		City of League City		Galveston County	
		Location	Improvement	Costs	Improvement	Cost	Improvement	Cost	Improvement	Cost
Short Range (0-5 years)	General	All signalized intersections	Signal timing coordination (Closed loop system or install GPS clocks. Does not include League City signals)	$10,000-$40,000						
Short Range (0-5 years)	Intersection	Hughes Rd	Add SB right turn lane storage	$30,000						
Short Range (0-5 years)	Intersection	SH 96 (League City Parkway)	Add exclusive EB and WB right turn lane storage.	$76,000						
Short Range (0-5 years)	Intersection	SH 96 (League City Parkway)	TxDOT planned grade separation over SH 3 (2018)	$7,700,000 (Per TIP)						
Short Range (0-5 years)	Segment	Walker St to FM 518	4/6-lanes with raised median and continuous sidewalks within existing pavement.	$407,000			Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
Short Range (0-5 years)	Segment	TOTAL FOR SHORT-TERM IMPROVEMENTS		$8,253,000		$0		$30,000		$0
Medium Range (5-15 years)	Intersection	Termini Dr	Potential traffic signal removal. TxDOT to evaluate need for Termini Dr traffic signal to remain once SH 3 has raised median.	$10,000						
Medium Range (5-15 years)	Intersection	Austin Street			Potential intersection realignment with Oak Park Street (dependent on long-term development)	TBD				
Medium Range (5-15 years)	Intersection	FM 518	Dual lefts on NB and SB approaches.	$25,000						
Medium Range (5-15 years)	Intersection	FM 518	Right turn lanes for EB and WB approaches	$76,000						
Medium Range (5-15 years)	Segment	Hughes Rd to Deats Rd	4-lanes with raised median and continuous sidewalks	$4,100,000	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000				
Medium Range (5-15 years)	Segment	Walker St to FM 518	6-lanes with raised median and continuous sidewalks with desired lane widths (requires moving curb and gutter)	$1,300,000			Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
Medium Range (5-15 years)	Segment	TOTAL FOR MEDIUM-TERM IMPROVEMENTS		$5,511,000		$30,000		$30,000		$0
Long Range (15 + years)	Intersection	FM 518	Dual lefts on EB and WB approaches	$76,000						
Long Range (15 + years)	Segment	Deats Rd to 20th St	4-lanes with raised median and continuous sidewalks (if warranted)	$2,200,000	Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000				
Long Range (15 + years)	Segment	20th St to Walker St	4-lanes with raised median and continuous sidewalks (if warranted)	$5,600,000			Landmark features (wayfinding signs, aesthetics, etc.)	$5,000-$30,000		
Long Range (15 + years)	Segment	FM 646	TxDOT planned FM 646 grade separation over SH 3 and RR	TBD						
Long Range (15 + years)	Segment	TOTAL FOR LONG-TERM IMPROVEMENTS		$7,876,000		$30,000		$30,000		$0
GRAND TOTAL				$21,640,000		$60,000		$90,000		$0

Project Results

The recommended improvements along both FM 517 and SH 3 were compared to the existing conditions to analyze the impact of benefits in terms of safety and mobility.

Safety

According to the Transportation Research Board Access Management Manual, the conversion of a TWLTL to a nontraversable raised median is projected to decrease the number of crashes by 30%. This percentage was applied to each corridor to compare the number of crashes for the short, medium and long-term improvements with the existing conditions as shown in **Figure 7-40.**

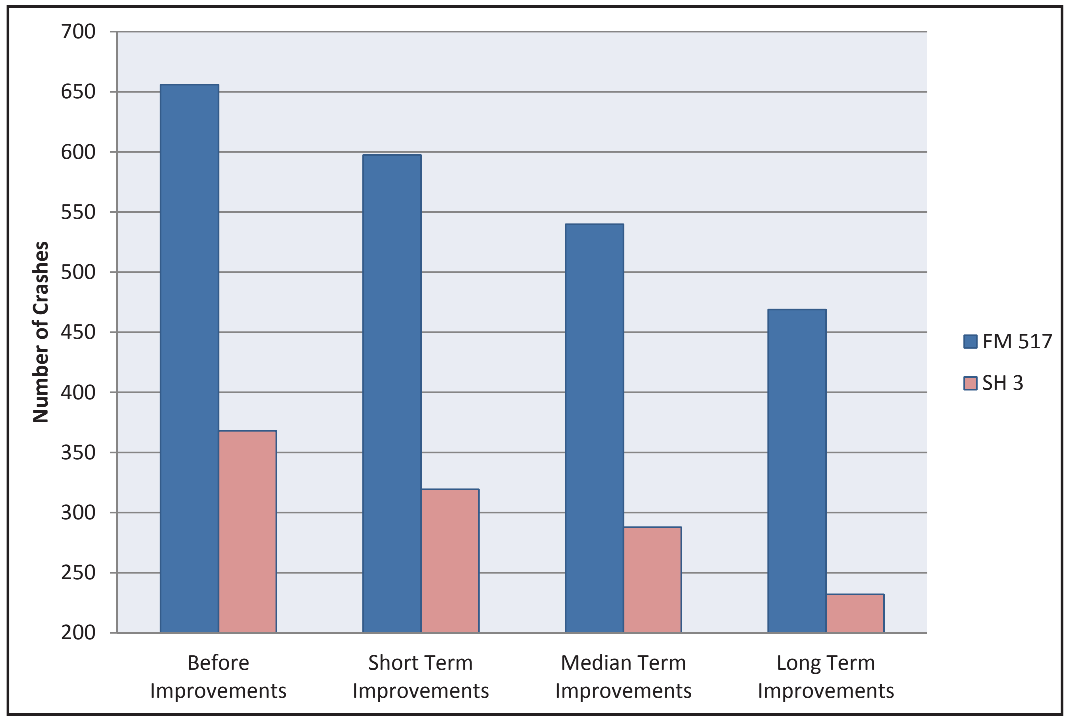


Figure 7-40: Projected crash reduction

In addition to vehicular safety, pedestrian safety is also improved when a nontraversable median is installed. According to the Federal Highway Administration (FHWA), pedestrian crashes account for about 12% of all traffic fatalities annually, and over 75% of these fatalities occur at midblock crossings. Providing a raised median and refuge area, especially midblock, has demonstrated a 40% reduction in pedestrian crashes according to FHWA. Although no pedestrian crash data is available on either corridor, this safety enhancement to pedestrian mobility is another noteworthy benefit.

Along with the safety impact of crash reductions on both corridors, there are also cost savings in terms of economic loss caused by collisions. Based on 2012 FHWA Safety Improvement, cost estimates for various injury types (fatality, incapacitating injury, non-incapacitating injury, possible injury, unknown injury and non-injury) have been estimated. These cost values were applied to the reduction in crashes to quantify the annual crash cost savings for each improvement scenario as shown in **Figures 7-41** and **7-42**.

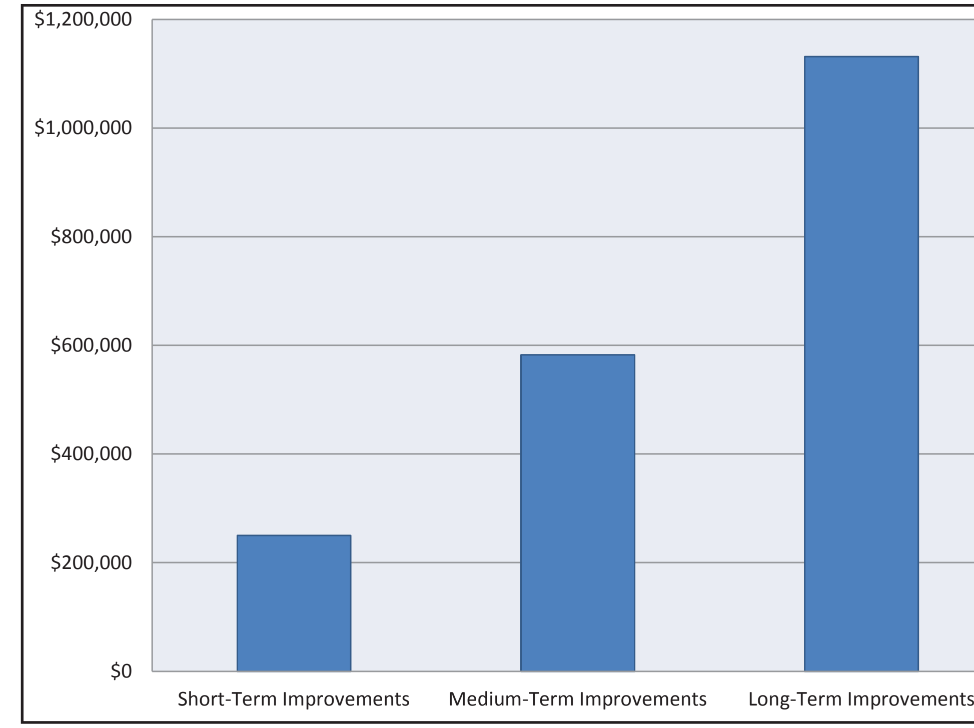


Figure 7-41: FM 517 Estimated Annual Crash Cost Savings for Improvement Scenarios

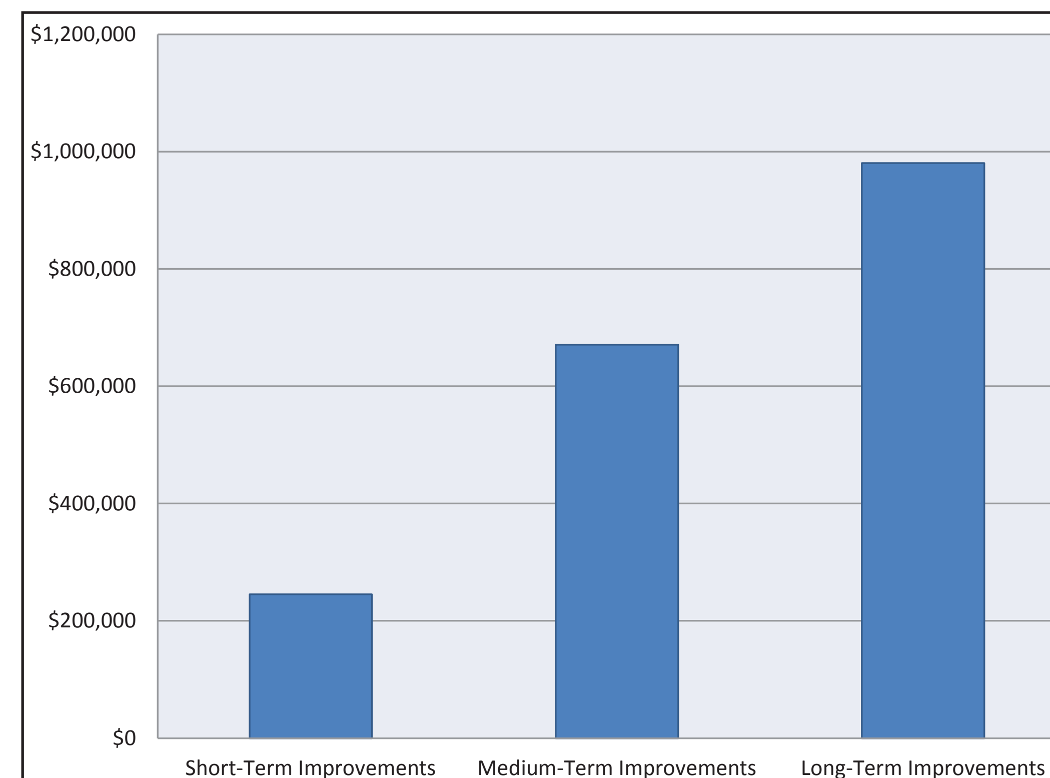


Figure 7-42: SH 3 Estimated Annual Crash Cost Savings for Improvement Scenarios

MOBILITY

The recommended improvements for both FM 517 and SH 3 corridors were added to the existing traffic operations model to analyze the impacts of the mobility benefits. Travel time savings was the key measure of effectiveness used to evaluate mobility benefits for each corridor and these results are summarized in **Figures 7-43** and **7-44**.

Travel time is the total travel time and delay incurred during travel along the corridor and is the product of the total travel time plus delay per vehicle (hours) and the total number of vehicles in the roadway network. Based on traffic simulation models and published research showing the mobility benefit of TWLTLs and nontraversable medians (TRB Access Management Manual), the recommended long-term improvements on FM 517 would result in corridor wide travel time savings of 189 hours in the AM peak hour and 186 hours in the evening peak hour during a normal weekday. Assuming 260 weekdays a year, the annual peak hour travel time savings are estimated at approximately 49,000 hours in the AM peak hour and 48,000 hours in the PM peak hour.

Results for SH 3 were less than FM 517 due to less congestion and lower volumes. The recommended long term improvements on SH 3 would result in corridor wide travel time savings of 71 hours in AM peak hour and 124 hours in the PM peak hour during a normal weekday. Assuming 260 weekdays a year, the annual peak hour travel time savings are estimated at approximately 18,000 hours in the AM peak hour and 32,000 hours in the PM peak hour.

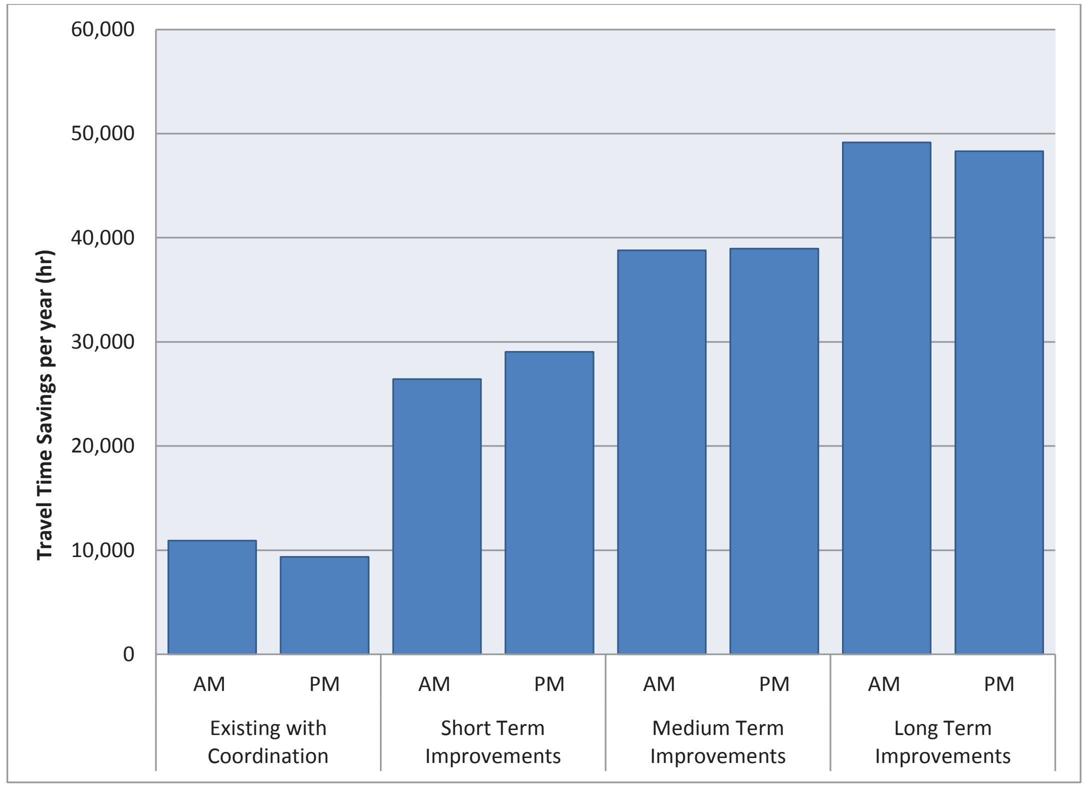


Figure 7-43: FM 517 Travel Time Savings Per Year (hours) Comparison for Improvements

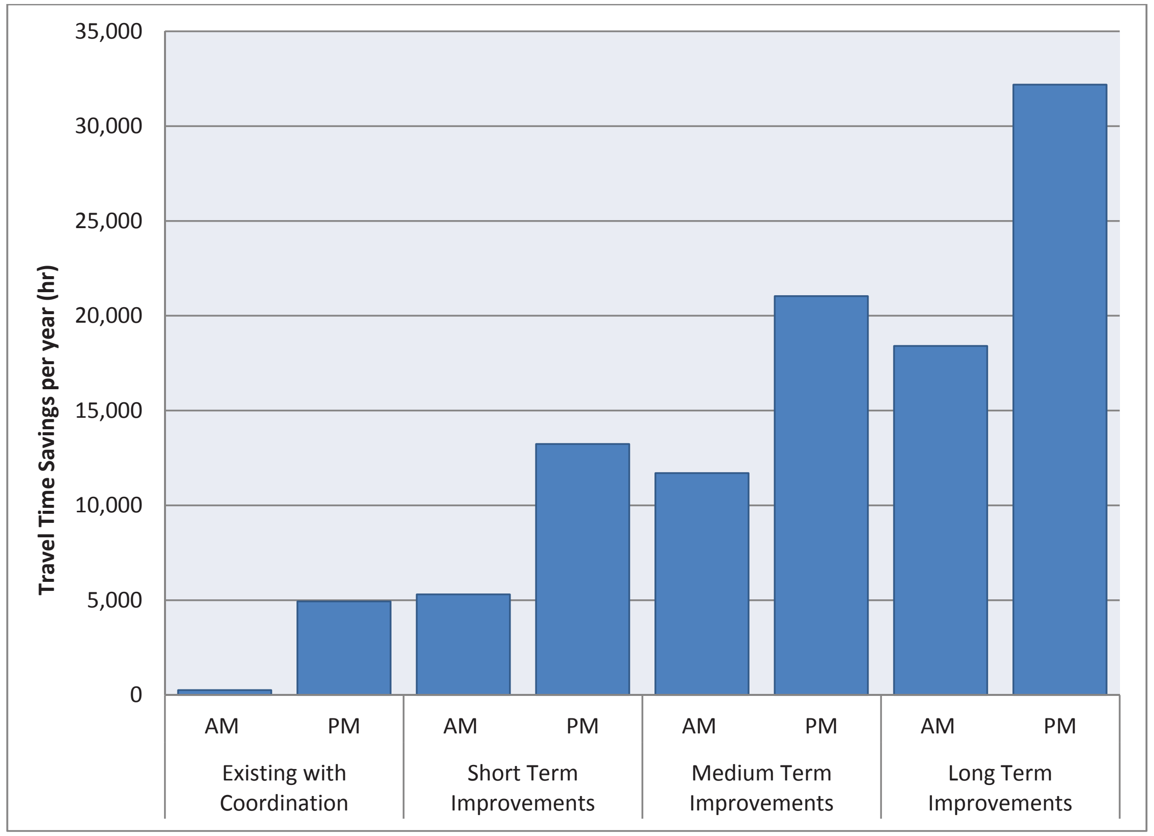


Figure 7-44: SH 3 Travel Time Cost Savings per Year (hours) Comparison for Improvements

According to the Houston TranStar 2010 Annual Report, the value of time based on congestion for the Houston area is $20.35 per vehicle-hour. Therefore, applying this value to the estimated travel time savings for each corridor, the travel time cost savings for FM 517 would be approximately $1,000,000 in the AM peak hour and $980,000 in the PM peak hour annually, as shown in **Figure 7-45**. Travel time savings for SH 3 would be approximately $375,000 in the AM peak hour and $655,000 in the PM peak hour as shown in **Figure 7-46**.

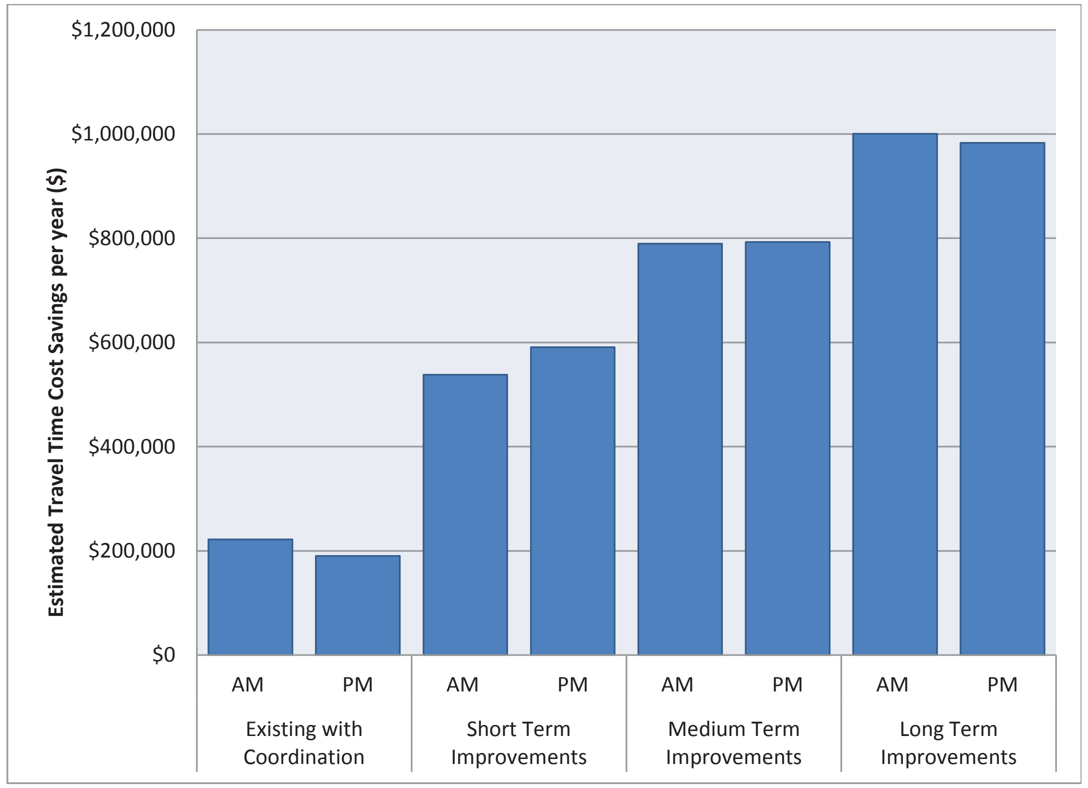


Figure 7-45: FM 517 Travel Time Cost Savings per Year Comparison for Improvements

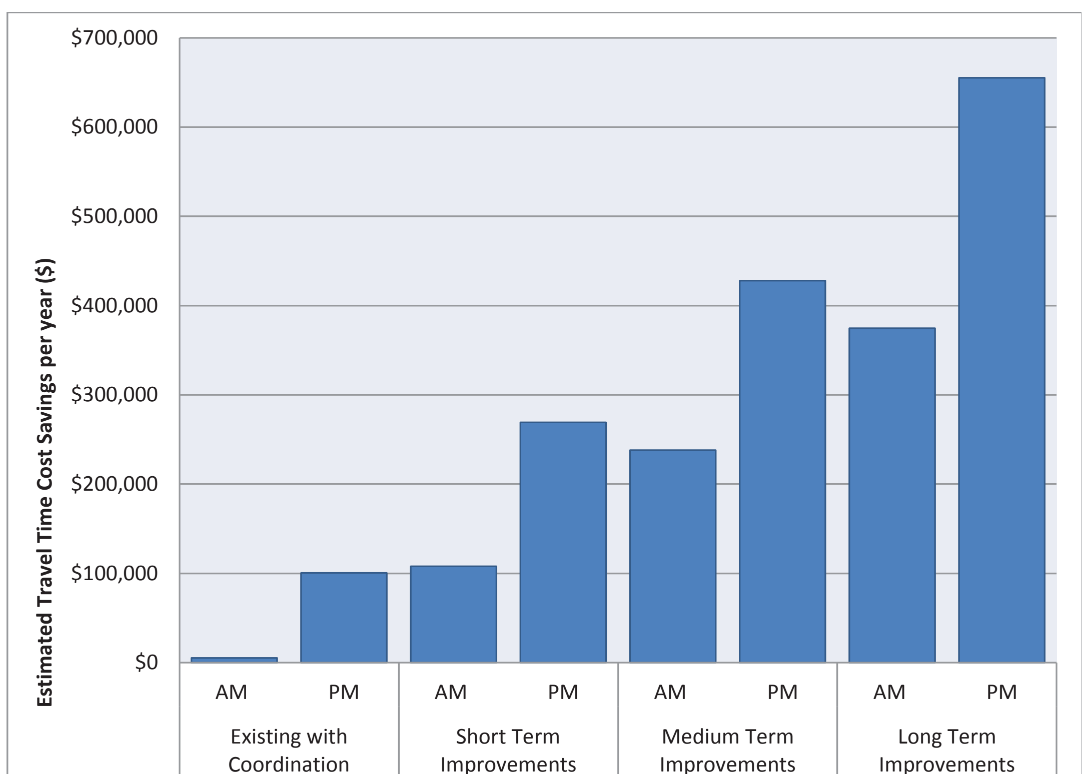


Figure 7-46: SH 3 Travel Time Cost Savings per Year Comparison for Improvements

Table 7-7 compares the existing and proposed intersection operations for short-term, medium-term, and long-term, both with and without improvements done to the intersections.

Table 7-7: Intersection operations with and without improvements

INTERSECTION	Short-term		Medium-term		Long-term	
	Without Improvements	With Improvements	Without Improvements	With Improvements	Without Improvements	With Improvements
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
FM 517 at Cemetery Rd.	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)
FM 517 at Shoreview Dr.	STOP CONTROLLED					
FM 517 at FM 646	D (D)	C (D)	D (D)	C (D)	D (E)	D (D)
FM 517 at Fire Station 2	EMERGENCY SIGNAL					
FM 517 at IH 45 NBFR	C (D)	C (D)	D (D)	C (D)	D (D)	C (D)
FM 517 at IH 45 SBFR	E (C)	D (C)	F (D)	B (D)	F (D)	C (D)
FM 517 at Maple Dr.	A (B)	A (A)	A (B)	A (A)	A (B)	A (A)
FM 517 at 44th St.	A (A)	A (A)	A (A)	A (A)	A (A)	A (A)
FM 517 at SH 3	D (C)	C (C)	D (C)	C (C)	D (D)	C (C)
FM 517 at Dickinson Ave	D (B)	C (B)	D (B)	B (A)	D (B)	B (B)
FM 517 at Texas Ave	EMERGENCY SIGNAL					
FM 517 at California Ave	B (A)	B (A)	B (A)	B (A)	B A	B (A)
FM 517 at Baker Dr.	STOP CONTROLLED					
FM 517 at Owens Dr.	C (B)	C (B)	C (B)	C (B)	C (B)	C (B)
SH3 at Hughes Rd.	C (C)	C (C)	D (C)	C (C)	D (C)	C (C)
SH3 at Termini St.	A (B)	A (B)	A (B)	A (B)	A (B)	A (B)
SH 3 at Deats Rd.	C (C)	C (C)	C (C)	C (C)	C (C)	C (C)
SH 3 at FM 646	C (C)	C (C)	C (C)	C (C)	C (C)	C (C)
SH 3 at League City PKWY (EB)	F (F)	E (E)	F (F)	E (E)	F (F)	E (F)
SH 3 at League City PKWY (WB)	F (F)	E (F)	F (F)	E (F)	F (F)	E (F)
SH 3 at E. Walker St.	D (D)	C (C)	D (D)	C (C)	D (D)	C (C)
SH 3 at W. Main St. (FM 518)	D (E)	D (D)	D (F)	C (D)	D (F)	C (D)

A.M. A.M. PEAK HOUR - 7.00 A.M. TO 8.00 A.M.
(P.M.) P.M. PEAK HOUR - 5.00 P.M. TO 6.00 P.M.

FM 517 and SH 3 Access Management Plan

MULTI-MODAL CONNECTIONS

Increased pedestrian accessibility to the corridor is a significant component of the proposed recommendations. Shared-use lanes, sidewalks, and planned bike routes are facilities through which pedestrians will have increased safety, as well as mobility. During public outreach, two frequently mentioned concerns were pedestrian safety and the lack of pedestrian-accessible facilities.

The existing corridor is equipped with sidewalks in some locations, and discontinuous in others. Sidewalks are proposed throughout the two corridors, but should be prioritized in order to maximize their utilization. Sidewalks are recommended to be constructed along with their parallel sections of roadway during the prioritization listed in earlier in this chapter.

In total, the FM 517 corridor is recommended to receive 4.4 miles of new sidewalks: 1.8 miles in the short-term and 2.6 miles in the medium-term. The long-term sections of FM 517 are all currently equipped with continuous sidewalk facilities. The SH 3 corridor is recommended to receive a total of 6.5 miles of new sidewalks: 0.2 mile in the short-term, 1.7 miles in the medium-term, and 4.6 miles in the long-term.

In addition to sidewalks, shared-use lanes are recommended for the length of both corridors. Shared-use lanes are lanes constructed wide enough (at least 14 feet) so that a vehicle and a bicyclist can use the lane concurrently. With the proposed recommendations, FM 517 would receive 6.7 miles of new shared-use lanes, and SH 3 would receive 5.0 miles of shared-use lanes.

AIR QUALITY

The recommended treatments proposed for the FM 517 and SH 3 corridors will have a direct benefit to the region's air quality. These benefits will come in the form of reduced criteria pollutants such as Nitric Oxide and Nitrogen Dioxide (NOx), Volatile Organic Compounds (VOCs), and Carbon Monoxide (CO), which are a direct result of improvements in vehicle travel time delay, speeds, and vehicle stops. Simply, the proposed recommendations reduce unnecessary vehicle idling and allow vehicles to drive at optimal speeds.

The air quality benefits of this project also broaden the potential funding mechanisms. The measures taken to improve traffic flow and to reduce delay in the corridor are eligible for Congestion Mitigation and Air Quality (CMAQ) funding. H-GAC prioritizes these projects based upon daily emission reduction estimates.

The study team calculated travel time savings, and H-GAC used the Texas "MOSERS" methodology in combination with MOBILE 6 emission factors to estimate air quality benefits. The air quality analysis findings performed on the proposed recommended improvements are shown in **Figure 7-47** for FM 517 and **Figure 7-48** for SH 3. Emissions savings during the morning and evening peak hours were projected for 2035.

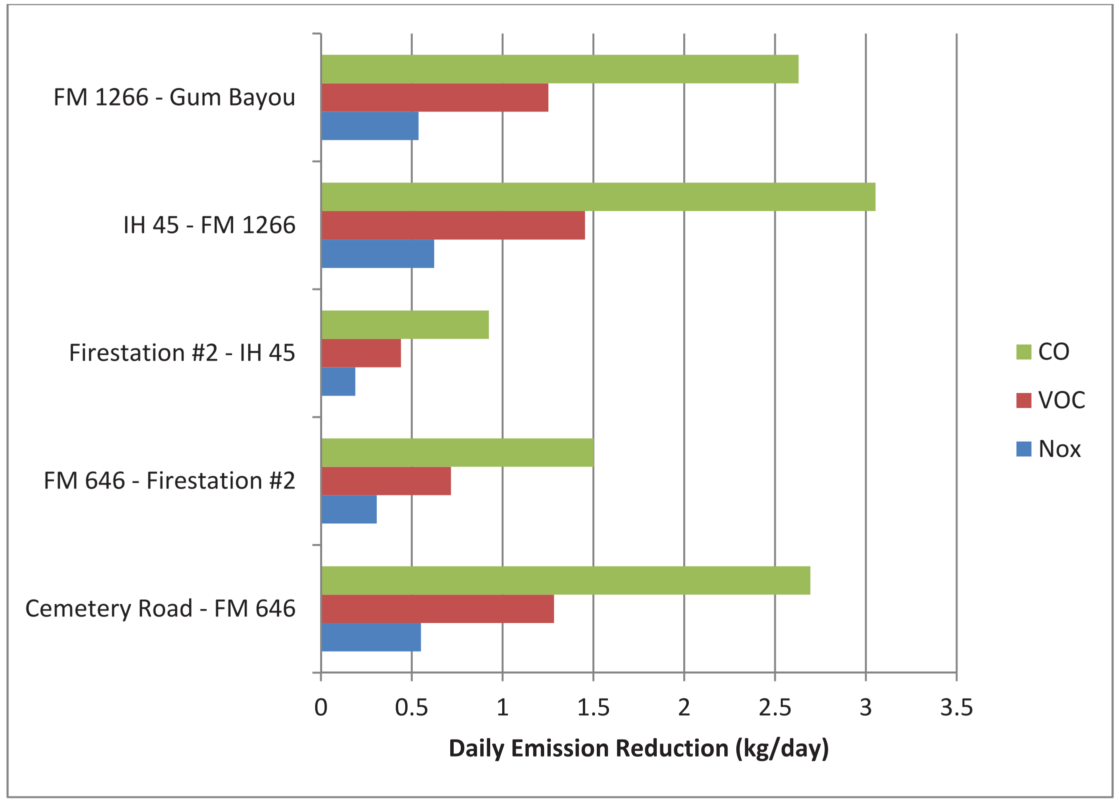


Figure 7-47: Reduction in daily emissions of NOx, VOCs, and CO along FM 517

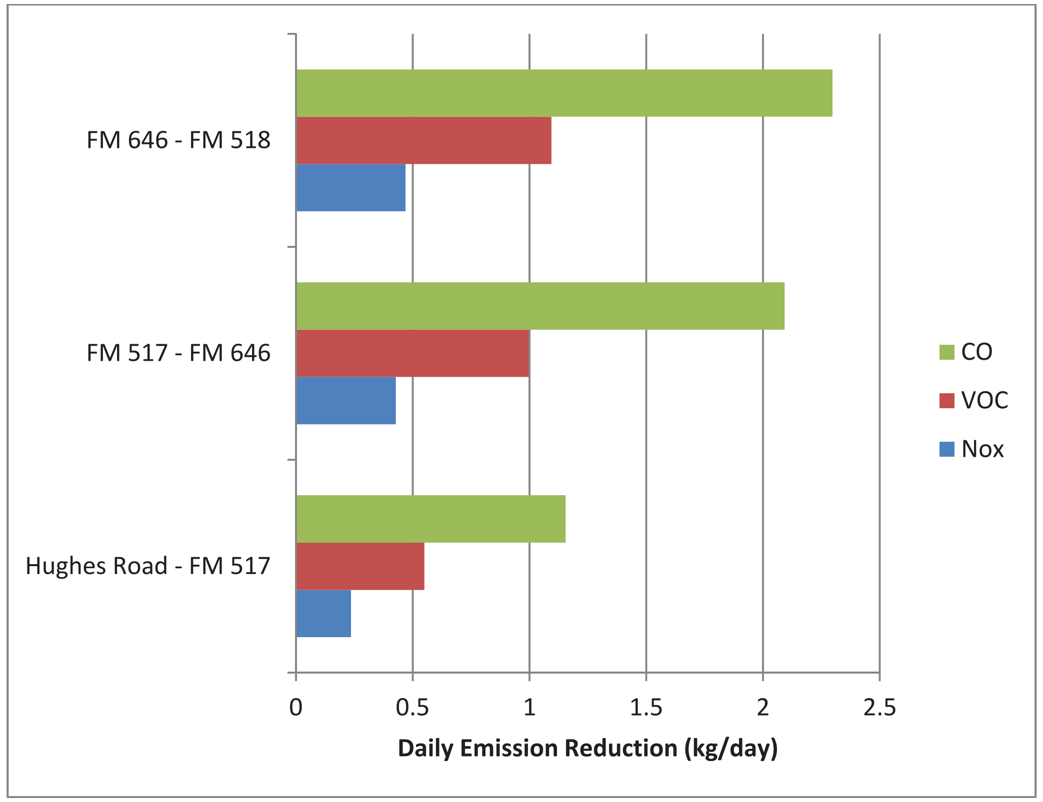


Figure 7-48: Reduction in daily emissions of NOx, VOCs, and CO along SH 3

BENEFIT-COST ANALYSIS

In order to assess the value of the proposed improvements to the corridor, a benefit-cost analysis was performed. Benefits include annual travel time savings and crash cost savings. These values, projected over a twenty year period were compared to the construction costs, in terms of today's dollars. The ratio of the benefits over a twenty year period to the phased costs of improvements was taken to estimate the desirability of the recommendations. If the benefit-cost ratio is less than one, the costs outweigh the benefits, but the higher the benefit-cost ratio is above 1.0, the more the benefits of the recommendations outweigh the costs of implementation. The estimated benefit-cost ratio for this study was estimated to be 1.4 for implementation of all recommendations.

PRIORITIZED PROJECTS

As mentioned previously, FM 517 has a section from FM 646 to Spruce Drive that has particularly high crash rates and traffic congestions issues. One potential solution is to prioritize the most critical part of this segment to be built first with the initial funding that becomes available, and then finish implementing the improvements to the remaining portions of the sections once additional funding and resources become available. Based on the traffic and crash analysis, is recommended that the improvements be constructed for the section from Kellner Road to Spruce Drive first. Then the section from FM 646 to Kellner Road can be constructed at a later date, if needed.

Chapter 8

Future Corridor Needs

POLICY RECOMMENDATIONS

The next step to implementing the recommendations for the Access Management study is for the cities to adopt the policies recommended in the document through elected and appointed bodies such as city councils, planning and zoning commissions, parks and recreation boards and public work and engineering. This solidifies public support, helps to establish community priorities and may affect grant eligibility.

Regulatory tools influence the character and quality of public and private access routes. Development regulations and standards are designed to further community priorities identified in the planning stage, as long as they do not unnecessarily delay or interfere with appropriate new development or redevelopment.

Land Use Policy Recommendations

Dickinson

Dickinson has land use policies, a subdivision ordinance and zoning regulations to help regulate the types of uses within the city limits. By developing and maintaining a comprehensive plan, it would allow the City and its residents to plan for the future and identify areas in which the community can properly plan for growth.

FM 517 – Determine the types of future land use the community would like to see developed or redeveloped along FM 517. When deciding on future land uses, determine what the roadway capacity would need to be to support those land uses. FM 517 is currently zoned for mostly single-family residential with areas of commercial at major intersections. Access to land development along FM 517 should be developed with the creation and use of parallel roads, side streets, and cross access easements connecting adjacent developments. Properties under the same ownership, consolidated for development, or part of phased development plans should be considered one property for the purposes of access management. Access points to such developments should be the minimum necessary to provide reasonable access, and not the maximum available, for that property frontage.

New residential subdivisions should include an internal street layout that connects to the streets of surrounding developments to accommodate travel demand between adjacent neighborhoods, without the need to use the major thoroughfare system. Residential subdivisions abutting arterial roadways should be designed so that street connections conform to the access connection spacing standards for those roadways. Commercial development should be encouraged to share common access connections as well as to provide a convenient system of inter-parcel circulation so that customers as well as delivery and service vehicles can move between the sites without accessing the FM roads. Zoning and subdivision actions shall discourage shallow commercial strip development where most, or all, access is directed to the abutting major public roadway. Thoroughfare planning should be coordinated with adjacent cities such as League City and Santa Fe to insure thoroughfare access is maintained at compatible levels.

SH 3 – Determine the types of future land use the community would like to see developed or redeveloped along SH 3. The roadway is currently zoned for mostly commercial with a small portion of single-family residential. Dickinson has implemented the SH 3 Overlay District to ensure the vision of the City is developed. Dickinson could implement build-to lines versus setback lines to create a more urban environment.

The cities should consider using the entire Texas Toolbox of economic development solutions to implement the City's Vision and Comprehensive Plan. The overlay district is a great start. The ability to implement the recommendations of this study will require additional funding. However, some of those recommended improvements could be financed by new private developers who are offered a reimbursement from sales or real property tax revenues to not only build their project but also finance offsite improvements to help implement the community vision. These agreements must be multi decade to pay for major road improvements, but could be an accelerator for development and redevelopment for all communities in this study area. The tools can be tailored to developer projects and community vision. Economic development tools can affect your land use goals and plan if the cities set up their policies in that manner.

League City

FM 517 – Access to land development along FM 517 should be preserved through the use of parallel roads, side streets, and cross access easements connecting adjacent developments. Properties under the same ownership, consolidated for development, or part of phased development plans shall be considered one property for the purposes of access management. Access points to such developments shall be the minimum necessary to provide reasonable access, and not the maximum available, for that property frontage. New residential subdivisions should include an internal street layout that connects to the streets of surrounding developments to accommodate travel demand between adjacent neighborhoods, without the need to use the major thoroughfare system. Residential subdivisions abutting arterial roadways should be designed so that street connections conform to the access connection spacing standards for those roadways. Commercial development should be encouraged to share common access connections as well as to provide a convenient system of inter-parcel circulation so that customers as well as delivery and service vehicles can move between the sites. Zoning and subdivision actions shall discourage shallow commercial strip development where most, or all, access is directed to the abutting major public roadway. Coordinate with adjacent cities such as Dickinson and Santa Fe to make sure land uses are compatible with each other.

SH 3 – Amend the subdivision ordinance to require an increased number of access points to a major thoroughfare or collector street when subdivision plat have more than an identified number of lots. Coordinate with adjacent cities such as Dickinson and Webster to make sure land uses are compatible with each other.

Economic Development Policy Recommendations

Communities should explore using all of the Texas Toolbox for Economic Development that can help the communities achieve their vision. The tools can be designed to fit each communities goals and can be applied to a variety of projects for both onsite and offsite improvements. The challenge for this study is the amount of ROW improvements required due to a lack of thoroughfare connectivity. The communities have grown over the last 3 decades but the thoroughfare tools were not in place to accommodate that increased urban density. It is not too late to plan for the next 30 years and still maintain the community vision. The use of the tools will require city council adoption and can be implemented over time. As stated previously, these agreements may need to be 20 years or longer for a private development who is also providing offsite improvements, but can be used as a match with other public funds to secure improvements for FM 517 and SH 3.

Cities may obtain sites that they can show to businesses that may relocate to the area. Such a site may be a tract of land that is ready for development. In certain cases, a city may find it beneficial to construct a basic structure that can be altered or developed to meet the new business needs. There are certain legal requirements regarding the procedure for a city to acquire such real property and limitations on the city's ability to sell or grant the land to a business entity. Chapter 273 of the Local Government Code provides a list of purposes for which a city may purchase property.

Dickinson

DEDC is responsible for all economic development policies within the City. The City has identified areas to be targeted for development and redevelopment. The DEDC has created some area 380 Agreements to incentivize development or redevelopment in specific areas. The City has passed Type B Tax. The City should expand the available tools used to promote offsite improvements that are described in this study.

FM 517 – The City should use available economic development policies to close unnecessary driveways or consolidate driveways with consenting property owners. The policy should provide incentives for driveway consolidation with adjacent property owners, wide sidewalks and street trees.

SH 3 – DEDC has established the Façade Incentive Program so existing and new commercial building owners could conform to the Highway 3 Overlay District architectural standards quicker than if the owner had to pay for it all him/herself. Consider allowing that incentive for offsite and onsite improvements and expand to include all Texas Economic Development Tools where appropriate. The policy should provide incentives for driveway consolidation with adjacent property owners, wide sidewalks and street trees.

League City

The City has passed Type B Tax. The City should consider allowing that incentive for offsite and on site improvements and expand to include all Texas tools where appropriate.

League City should use available policies to close unnecessary driveways or consolidate driveways with consenting property owners. The policy should provide incentives for driveway consolidation with adjacent property owners, wide sidewalks and street trees.

Transportation Policy Recommendations

Adding recommendations from the Access Management Study to each cities Capital Improvement Program helps prioritize for proposed transportation improvements for all modes of transportation.

Dickinson

Dickinson does not have a major thoroughfare/collector plan. A Major Thoroughfare & Freeway Plan would require the necessary dedication of ROW for streets to be dedicated or be extended between subdivisions and provide connectivity between developments during platting process. This discontinuous local street network has resulted in increased traffic pressure on major thoroughfares such as FM 517, SH 3, FM 1266 and Hughes Road. The ability to create interconnected local street systems provides access to all areas of the cities without necessarily using the limited access facilities. Correcting the streets access will require a change in local ordinances to create block length requirement and mandate connectivity. This provision is allowed under the subdivision ordinance statue in Texas. When creating the major thoroughfare/collector plan, be sure to connect in to League City's and Texas City's existing major thoroughfare/collector plan.

FM 517 and SH 3:

- Determine the types of future land use through the comprehensive plan.
- A non-traversable, landscape median should be provided on all new multi-lane arterials that meet the standards of the TxDOT Access Management Manual.
- All existing undivided roadways and roadways with a continuous left turn land should be considered for reconstruction when the roadway volume exceeds 20,000 VPD.
- Consider median barrier techniques for all un-signalized median openings.
- Consolidate driveways.
- Coordinate new developments along corridor to align with existing driveways and require driveway connection with side streets versus major thoroughfare.
- Require five (5) foot sidewalks for better pedestrian access along major thoroughfares and collector streets and at least a four (4) foot along local streets.

League City

The League City Master Mobility Plan (2011) was developed to address projected traffic congestion and other mobility challenges. The Plan included multi-modal solutions that accommodated roadway needs, pedestrian network, bicycle lanes, shared-use paths (i.e., hike & bike trails), commuter rail, regional bus transit (park & ride), local bus transit, and marine transportation. The Mobility Plan recommends access management strategies and street connectivity improvements that will achieve a more safe and reliable transportation system. Implementing the following strategies along the FM 517 and SH 3 corridors are consistent with the Mobility Plan.

FM 517 and SH 3:

- A non-traversable, landscape median should be provided on all new multi-lane arterials that meet the standards of the TxDOT Access Management Manual.
- All existing undivided roadways and roadways with a continuous left turn land should be considered for reconstruction when the roadway volume exceeds 20,000 VPD.
- Consider median barrier techniques for all un-signalized median openings.
- Consolidate driveways.
- Coordinate new developments along corridor to align with existing driveways and require driveway connection with side streets versus major thoroughfare.
- Require five (5) foot sidewalks for better pedestrian access along major thoroughfares and collector streets and at least a four (4) foot along local streets.

Chapter 9

Study Recommendations and Action Plan

The study team utilized traffic modeling software, crash analysis techniques, and field verifications to examine the current situation along FM 517 and SH 3. The Corridor Steering Committees approved a menu of access management treatments based upon the following goals:

- Improve safety for all modes of transportation
- Improve mobility
- Create a growth strategy for the corridor that provides guidance without hindering development
- Create multi-modal connections in the corridor
- Maintain an open public process
- Implement a uniform access management policy

The study team then applied these access management techniques throughout the corridor. The conceptual improvements as well as the associated benefits and costs were revised based on comments from the public. The following study recommendations and action plan is the product of a comprehensive public involvement process, coordinated effort amongst all interested parties, and continuation of the partnerships needed for success. **Table 9-1** summarizes the short-, medium- and long-term estimated costs for each jurisdiction.

Table 9-1: Summary of Estimated Costs

FM 517			
Improvement Phases	TxDOT	City of Dickinson	City of League City
Short-Term (0-5 yr)	$1,330,000 - 1,380,000	$20,000	$0
Medium-Term (5-15 yr)	$14,744,000	$10,000 - 60,000	$5,000 - 30,000
Long-Term (15+ yr)	$9,700,000	$90,000	$0
Total	$25,824,000	$170,000*	$30,000*

*Depends on cost of landscaping and aesthetics

Table 9-2: Summary of Estimated Costs

SH 3				
Improvement Phases	TxDOT	City of Dickinson	City of League City	Galveston County
Short-Term (0-5 yr)	$8,223,000 - 8,253,000	$0	$5,000 - 30,000	$0
Medium-Term (5-15 yr)	$5,511,000	$5,000 - 30,000	$5,000 - 30,000	$0
Long-Term (15+ yr)	$7,876,000	$5,000 - 30,000	$5,000 - 30,000	$0
Total	$21,640,000	$60,000*	$90,000*	$0

*Depends on cost of landscaping and aesthetics

9.1 SHORT-TERM RECOMMENDATIONS

The short-term recommendations concentrate on improvements that do not require major purchases of ROW, have a short construction period and need only minor coordination with property owners. The construction of medians within the existing pavement for two priority sections of FM 517 and SH 3 will result in the largest benefit.

9.2 MEDIUM-TERM IMPROVEMENTS

Medium-term improvements involve projects that can be implemented within five to fifteen years. The primary medium-term improvement is widening the roadway sections to include a raised median as well as intersection improvements and pedestrian accommodations.

9.3 LONG-TERM IMPROVEMENTS

The final sets of improvements along the corridor are the long term projects that require major construction dollars, generally within a 15 to 30 year time frame. The improvements consist of constructing a raised median on selected segments of FM 517 and SH 3 along with intersection improvements and accommodating bicycle and pedestrian needs. The long-term improvements should be considered as redevelopment is planned and congestion increases. As development plans become more focused, the long-term recommendations can be used as a communication tool for City staff and developers in coordinating future transportation infrastructure.

The success of the FM 517/SH 3 Corridor Access Management Plan is dependent on the formation or strengthening of partnerships among the variety of involved entities. This section seeks to clearly identify the roles and responsibilities of each agency in meeting the goals of this study.

Steps	Agency
1. Policy board acceptance of FM 517/SH 3 study	H-GAC
2. Adopt FM 517/SH 3 Corridor Access Plan by ordinance	Cities
3. Implement system-wide signal retiming	TxDOT
4. Secure funding for short-term improvements	H-GAC and TxDOT
5. Coordinate with TxDOT for median aesthetics	Cities
6. Perform design for short-term improvements	TxDOT
7. Implement short-term improvements	TxDOT
8. Secure funding for medium-term improvements	H-GAC and TxDOT
9. Perform environmental documentation and schematic design	TxDOT
10. Perform detailed design of medium term improvements once environmental documentation approved	TxDOT
11. Implement medium-term improvements	TxDOT
12. Program long range thoroughfare improvements	Cities
13. Secure funding for long-term improvements	H-GAC and TxDOT
14. Perform environmental documentation and schematic design	TxDOT
15. Perform detailed design of long-term improvements once environmental documentation approved	TxDOT
16. Update comprehensive plans and subdivision standards	Cities

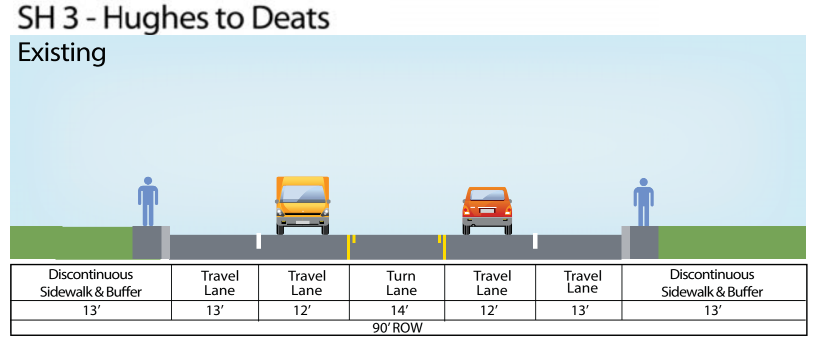
This corridor plan attempted to gain the input and concurrence of local business leaders, stakeholders, city officials, regional leaders, and the general public. It is clear from the technical analysis and public process that implementing the short-term and medium-term improvements along with system-wide signal retiming will provide the greatest relief in terms of operations. The long-term improvements that are contained herein can be implemented as funding and need arises. With that said, in order to begin to develop the remainder of the corridor it is critical that the policy recommendations contained in Chapter 8 be incorporated into each cities' suite of development regulations. This will allow for the corridor to develop in a more sustained manor. The fact is that incremental improvements will provide relief but long lasting sustainable corridor success will only be achieved if some level of discipline is exercised to control access to developments.

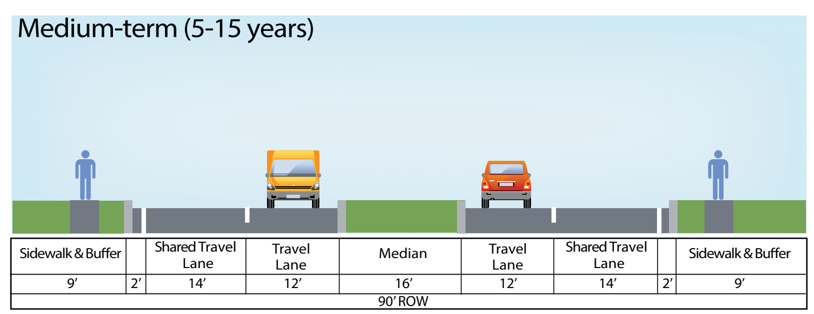
Appendix A
Design Details

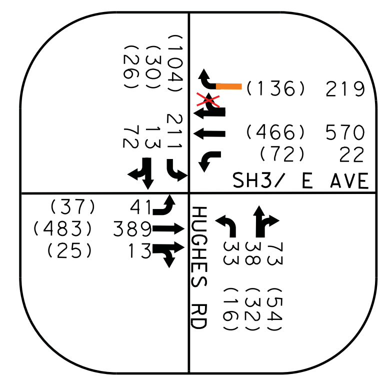
LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

SH 3 - Hughes to Deats







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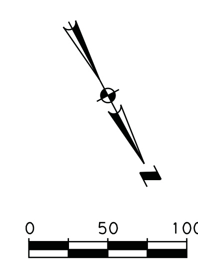
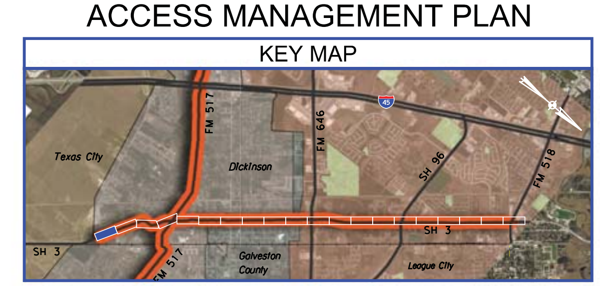
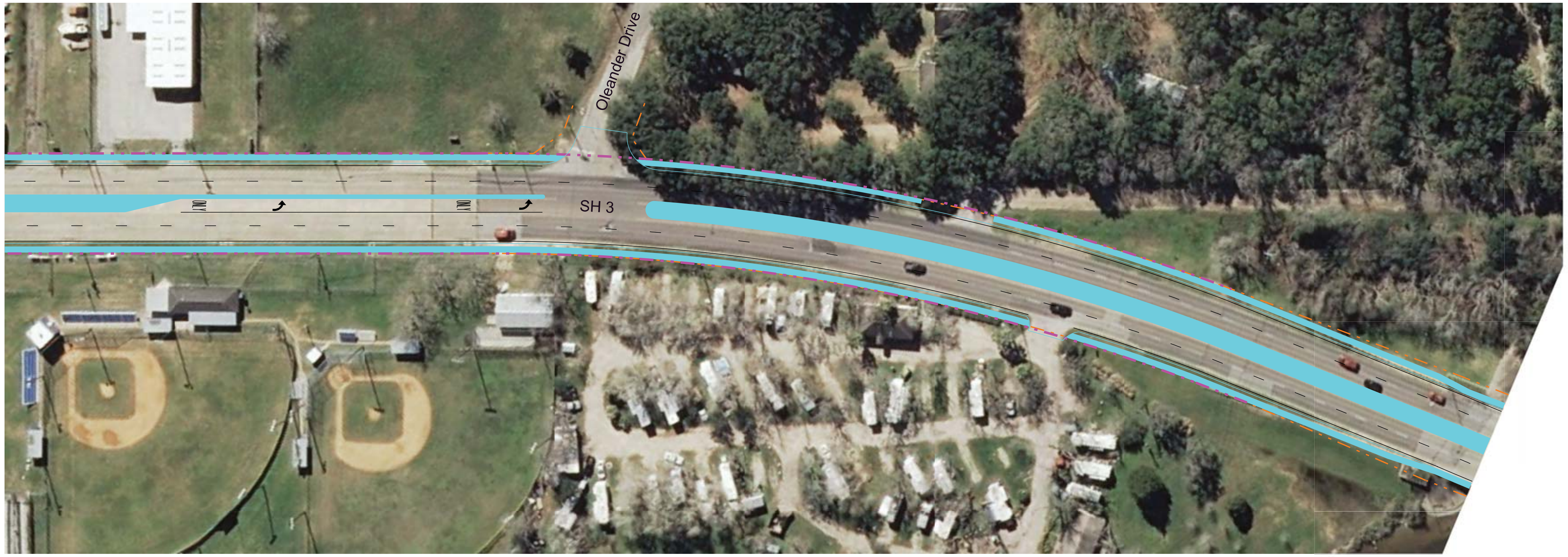


FM 517 AND SH 3
ACCESS MANAGEMENT PLAN





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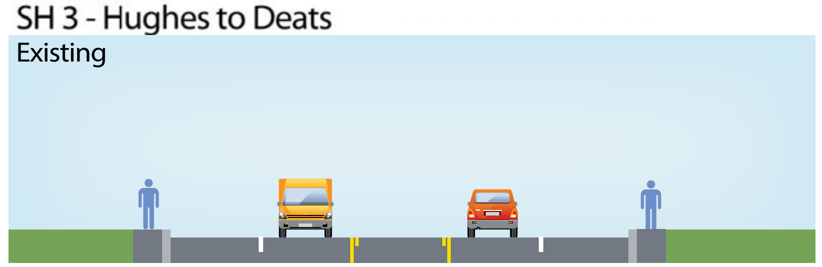
SH 3 - Hughes to Deats

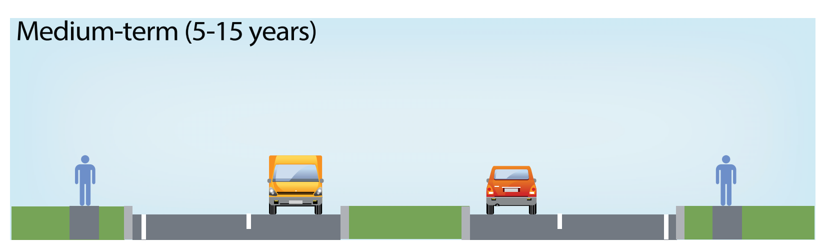
Existing



Discontinuous Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Discontinuous Sidewalk & Buffer
13'	13'	12'	14'	12'	13'	13'

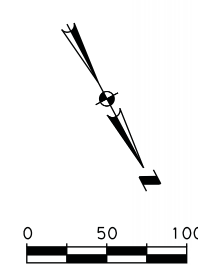
90' ROW

Medium-term (5-15 years)



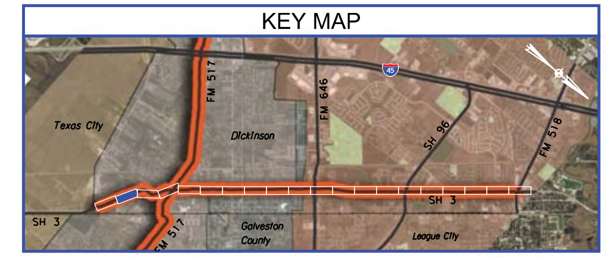
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
9'	2'	14'	12'	16'	12'	14'	2'	9'

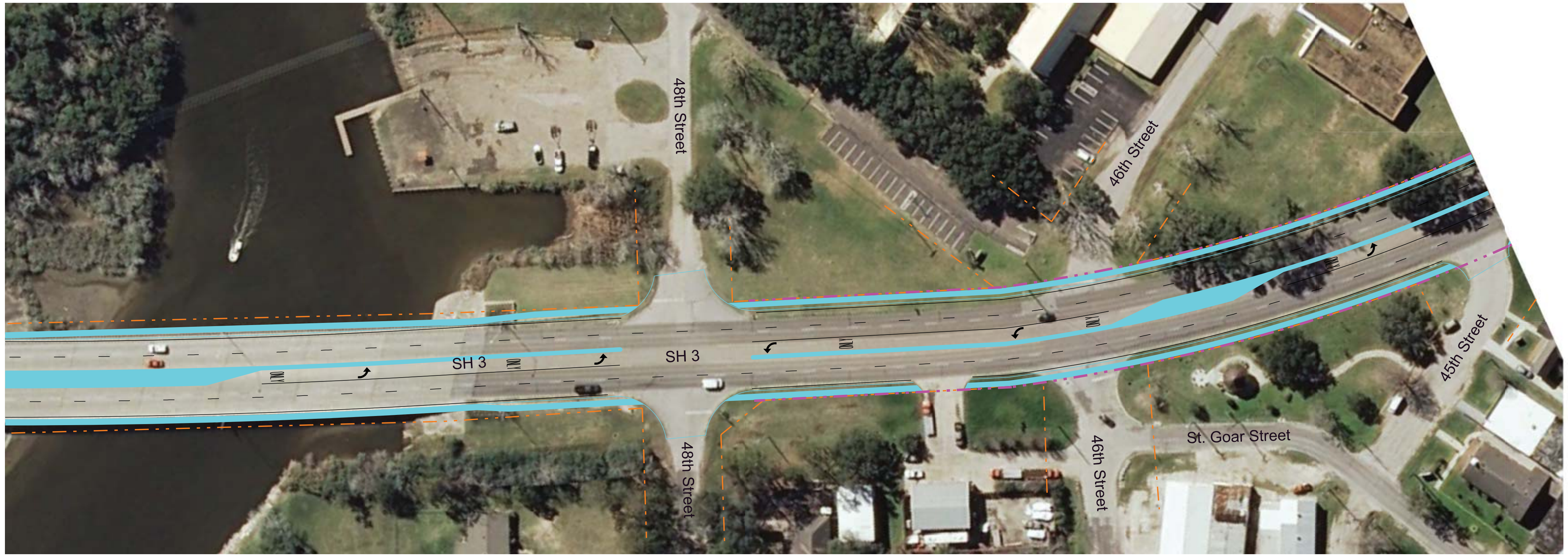
90' ROW



FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

KEY MAP





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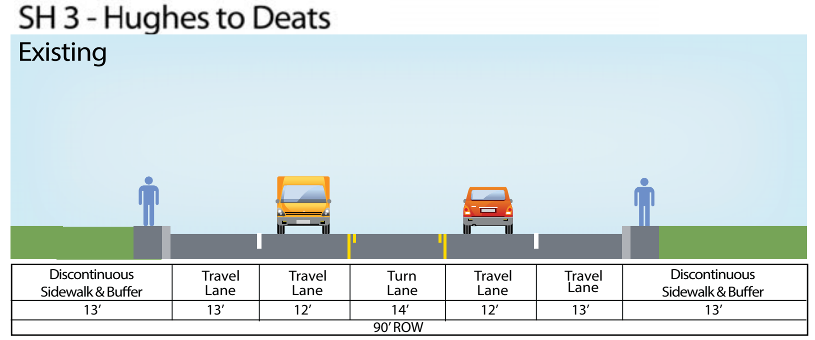
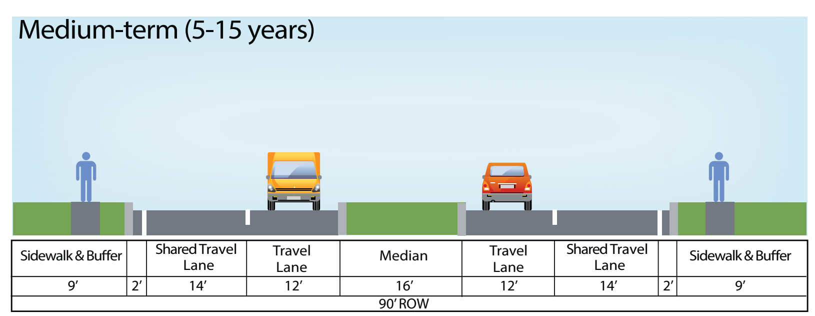


Medium-term (5-15 years)

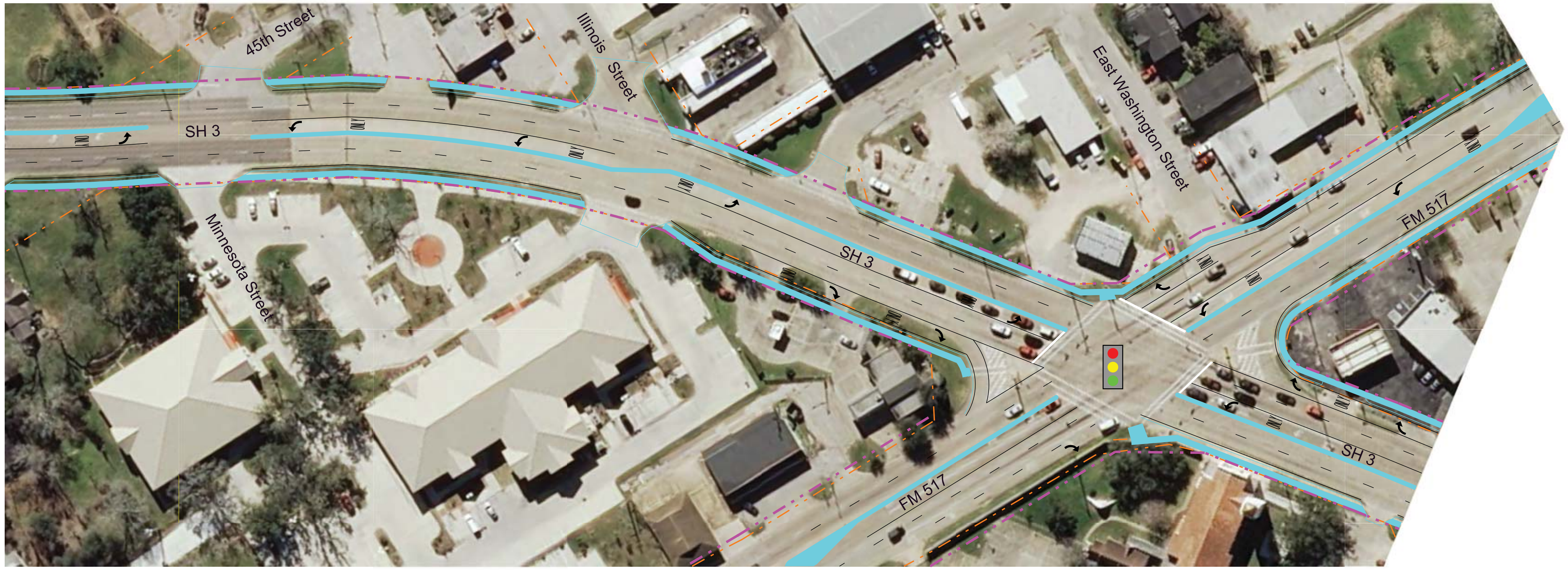


0 50 100

SCALE: 1" = 100'

FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



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SH 3 - Hughes to Deats

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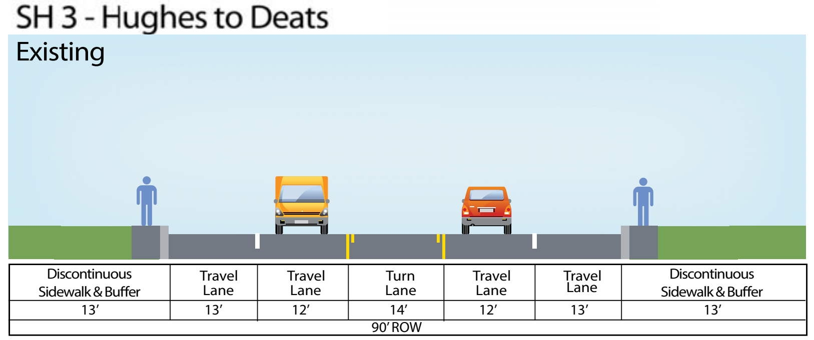
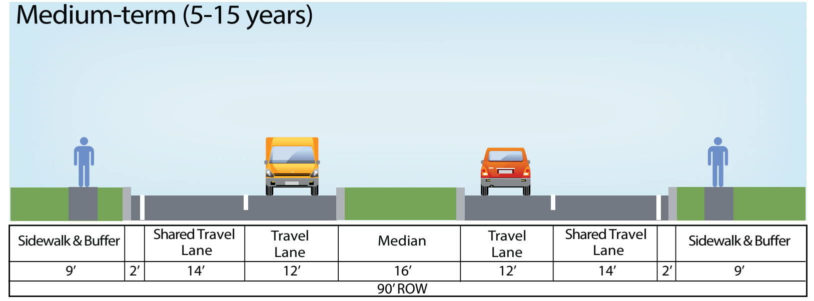
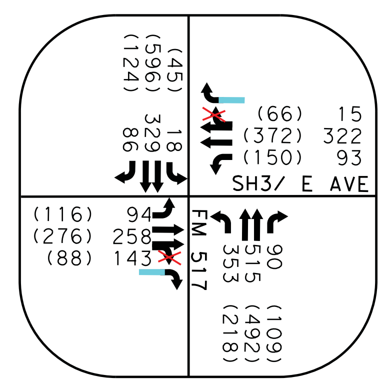
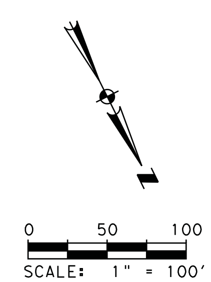


Medium-term (5-15 years)



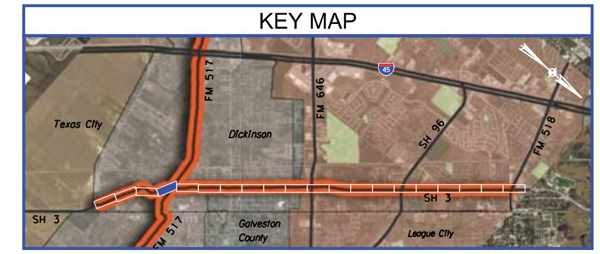


AM (PM) PEAK HOUR VOLUMES



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



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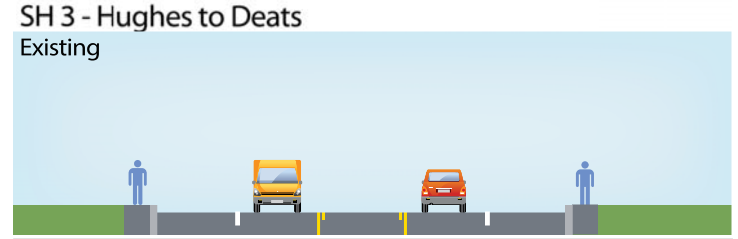
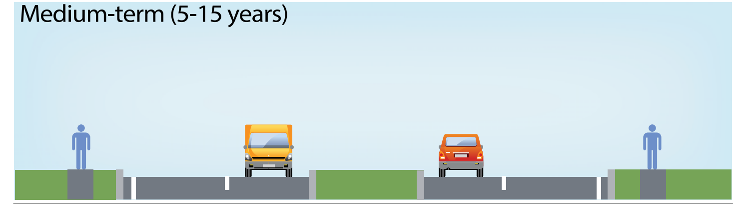


Discontinuous Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Discontinuous Sidewalk & Buffer
13′	13′	12′	14′	12′	13′	13′
90′ ROW						

Medium-term (5-15 years)



Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
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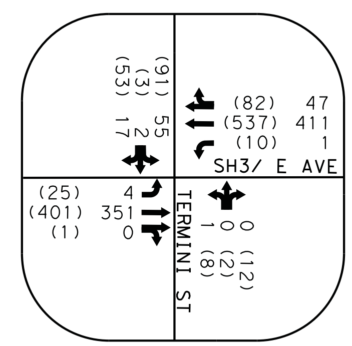
90′ ROW								



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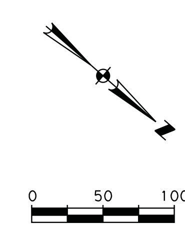

FM 517 AND SH 3
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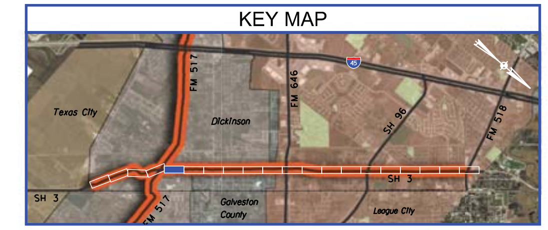

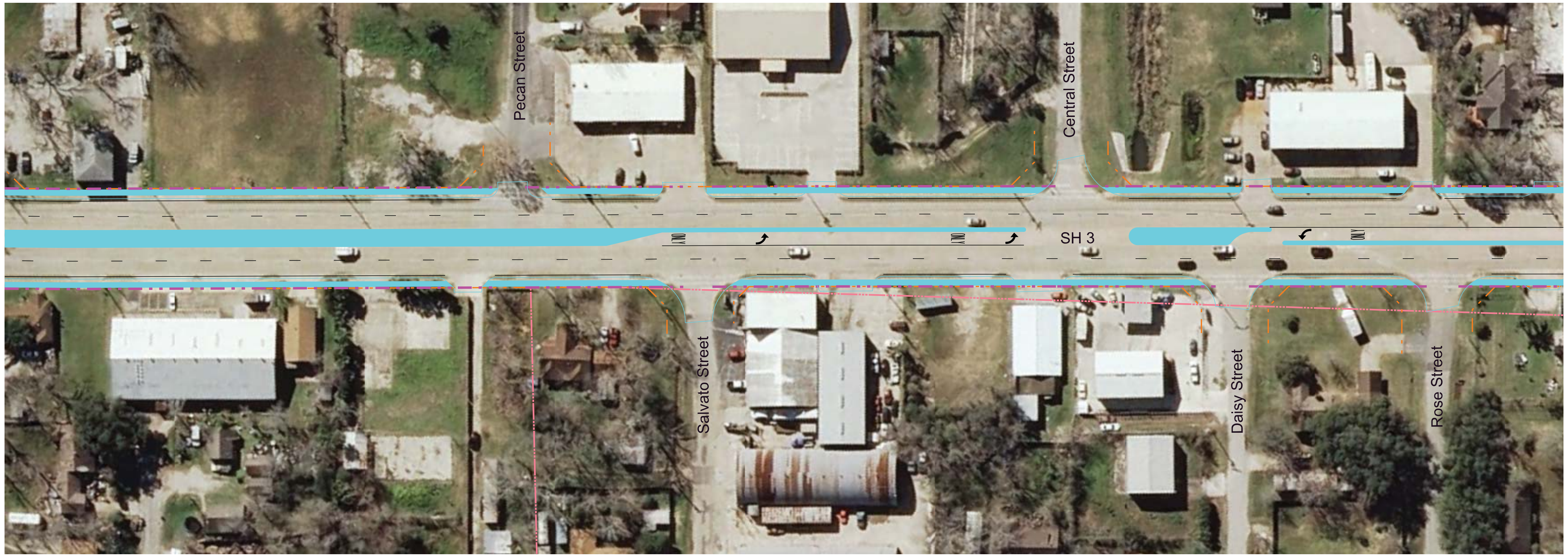

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SH 3 - Hughes to Deats

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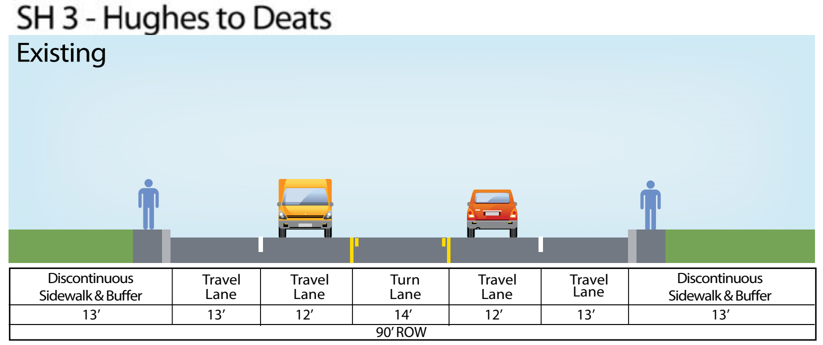
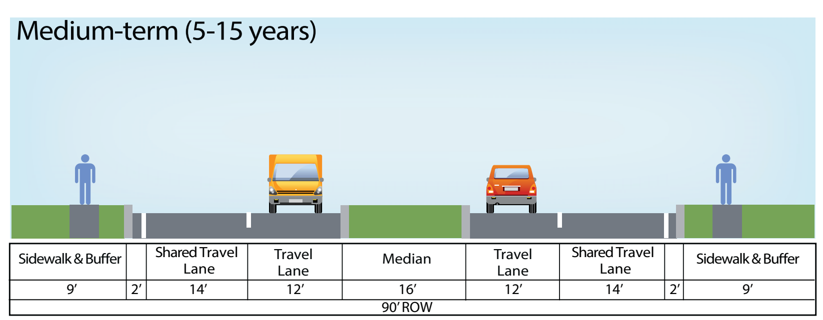
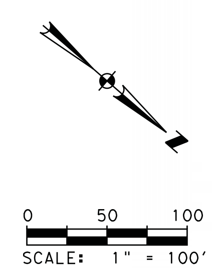


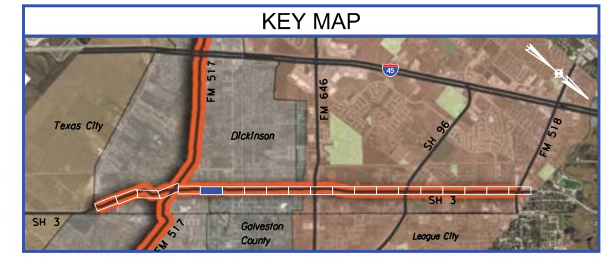
Medium-term (5-15 years)





FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



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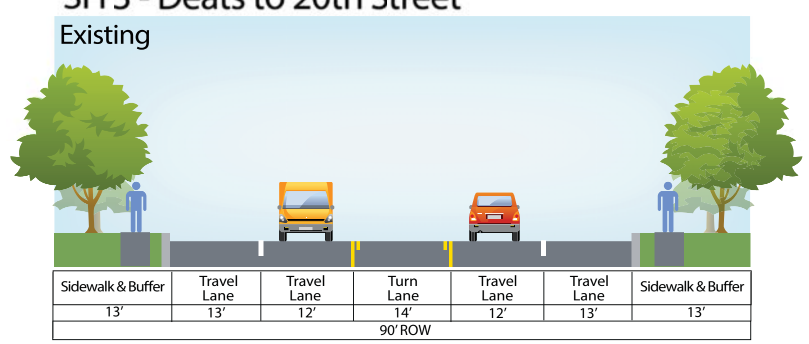
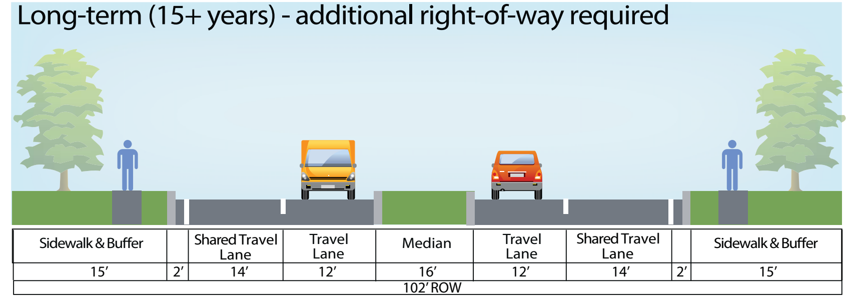
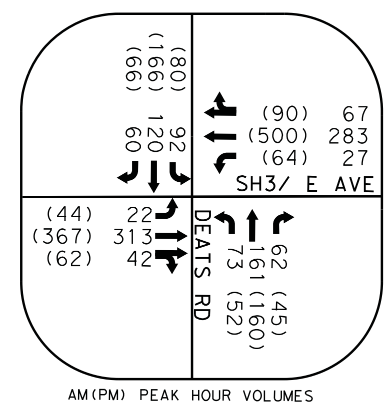
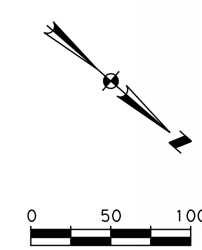
SH 3 - Deats to 20th Street

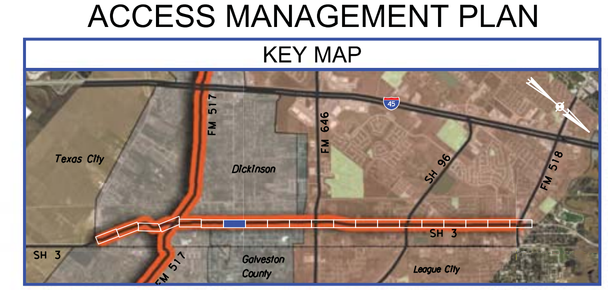








FM 517 AND SH 3 ACCESS MANAGEMENT PLAN



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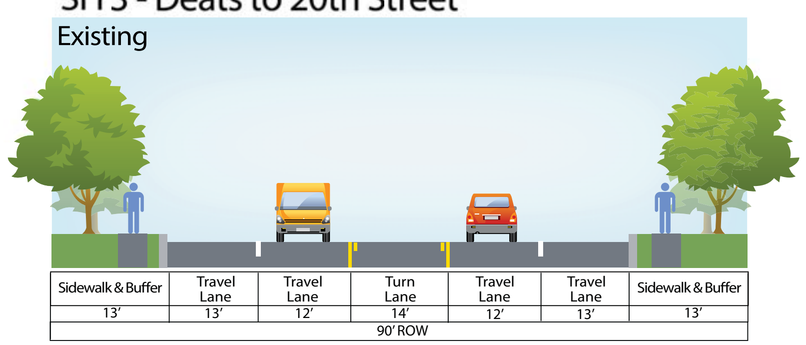
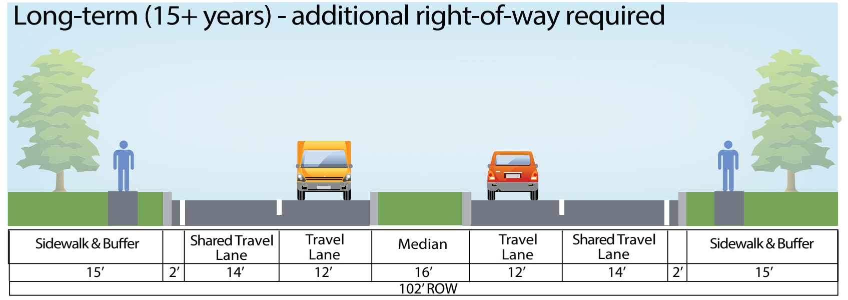
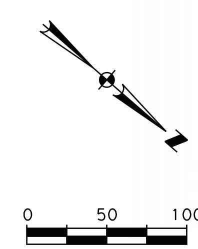
SH 3 - Deats to 20th Street

Existing



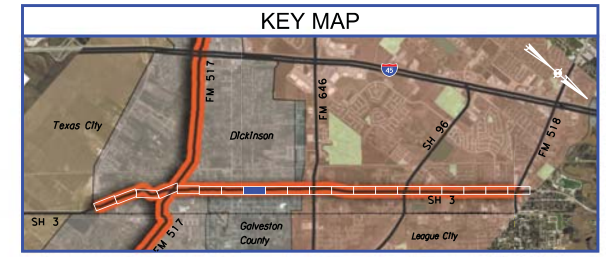
Long-term (15+ years) - additional right-of-way required

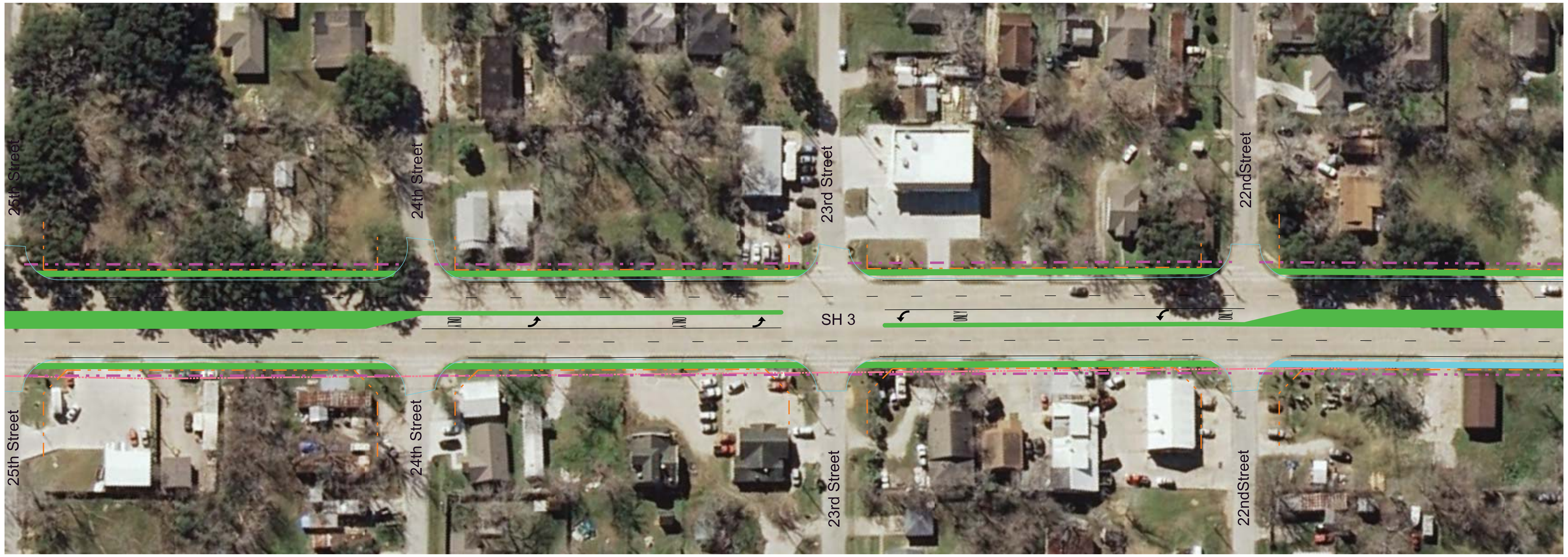




FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP





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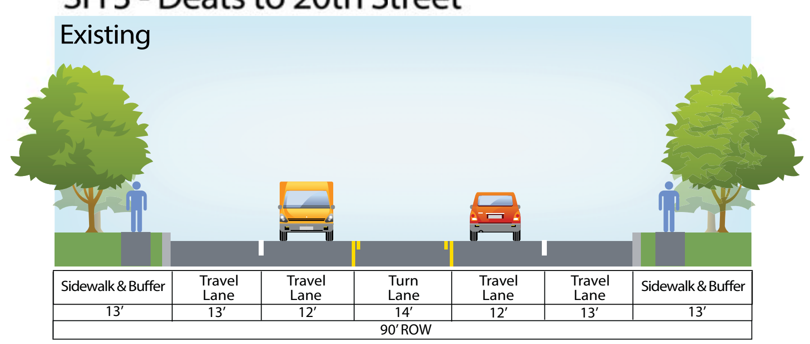
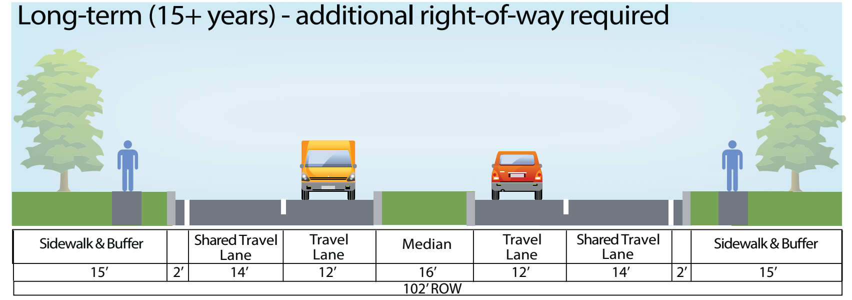
- Jurisdictional Boundaries

SH 3 - Deats to 20th Street



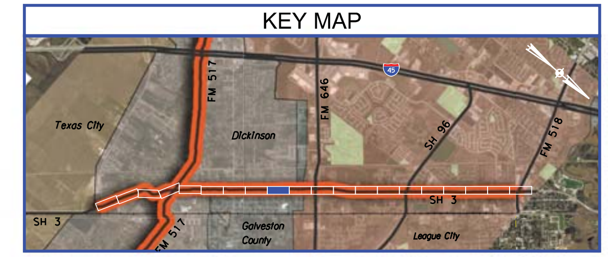
Long-term (15+ years) - additional right-of-way required

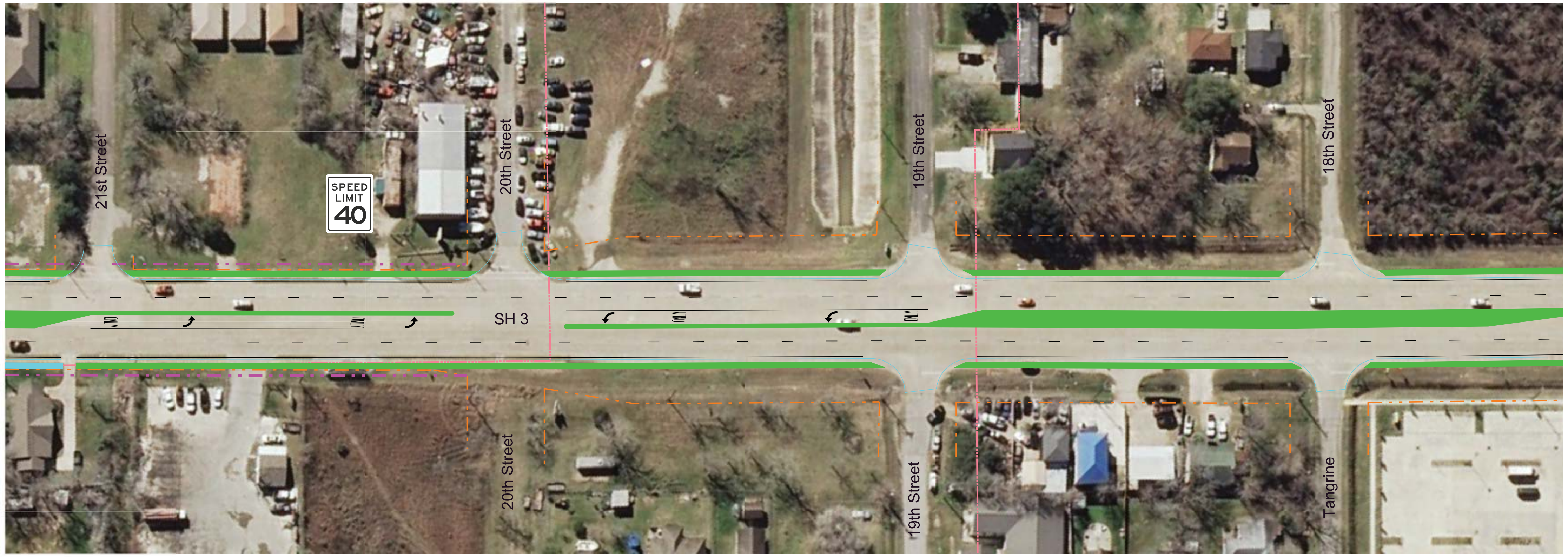


0 50 100
SCALE: 1" = 100'

FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP

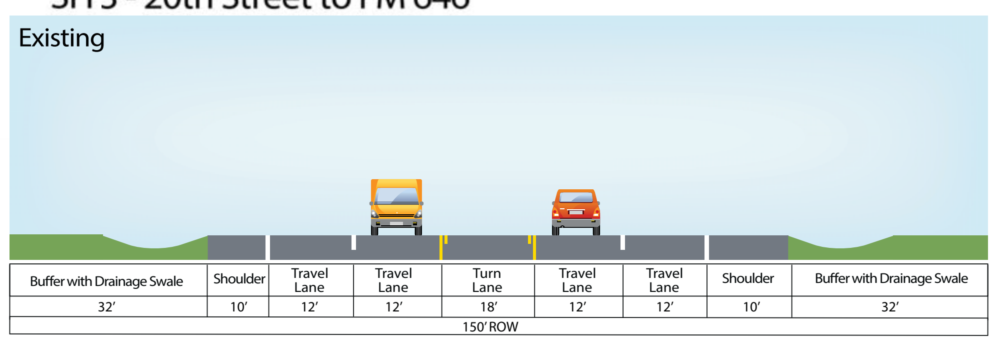


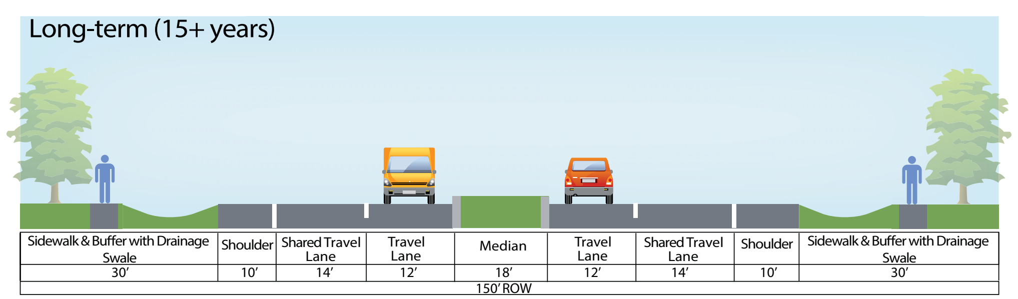


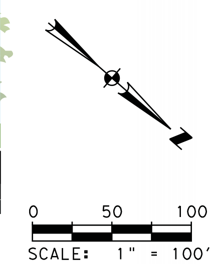
LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

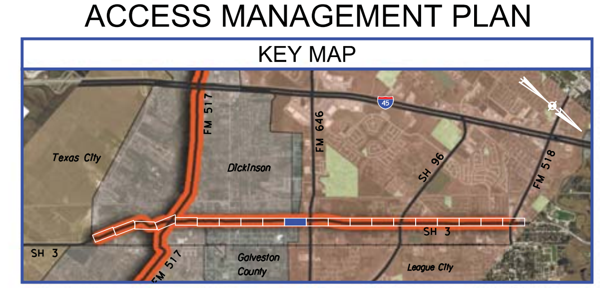
SH 3 - 20th Street to FM 646

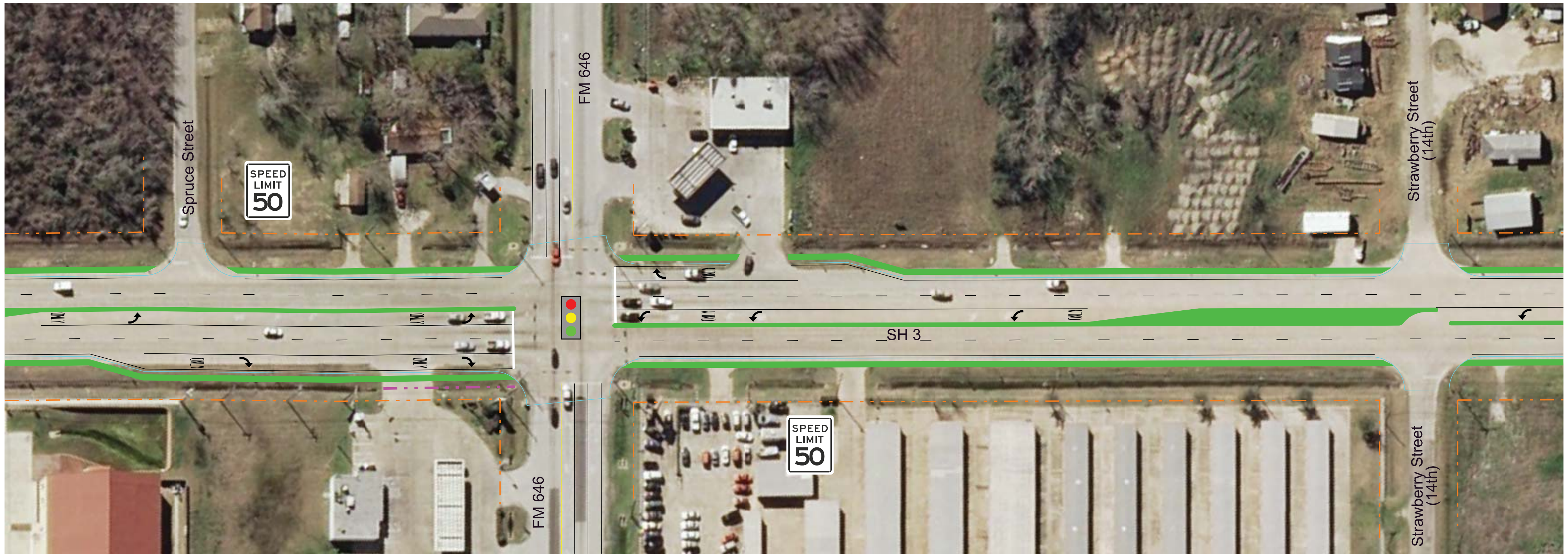






FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

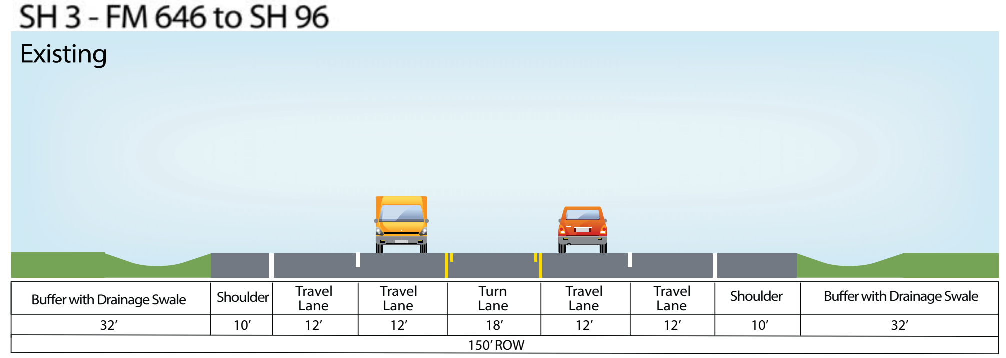


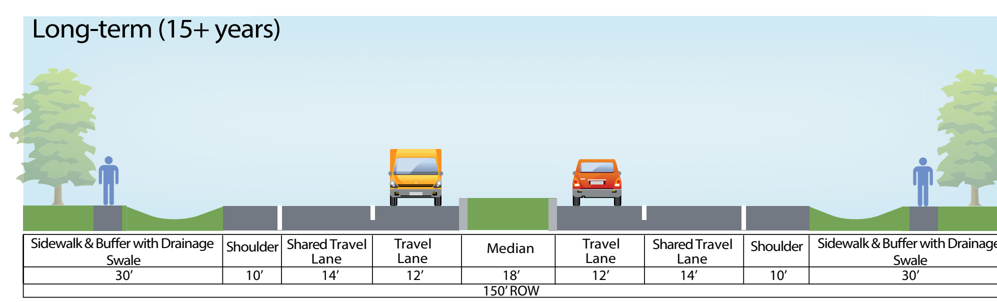


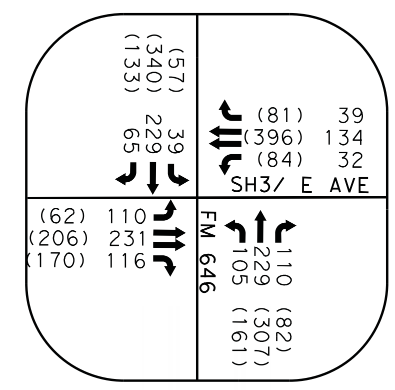
LEGEND

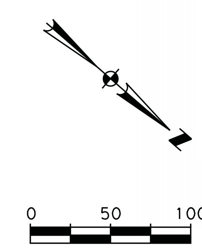
- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

SH 3 - FM 646 to SH 96



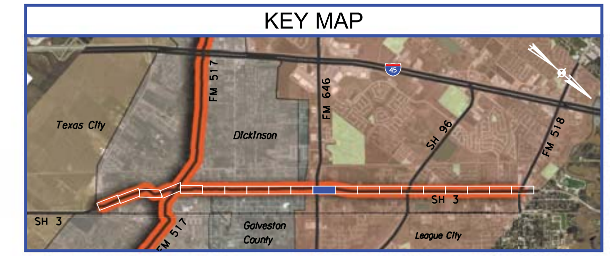


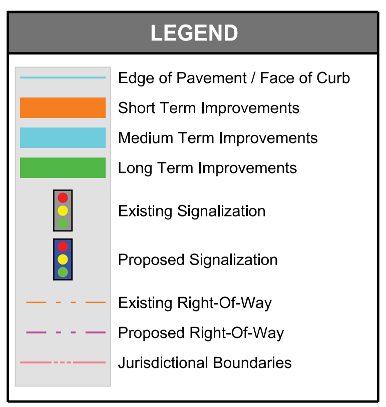




FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

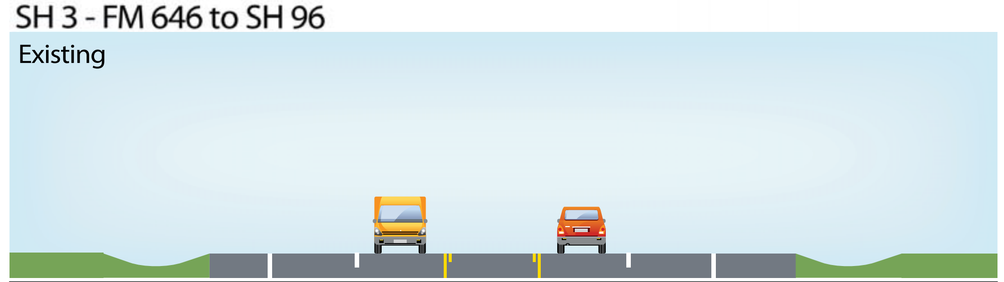
KEY MAP





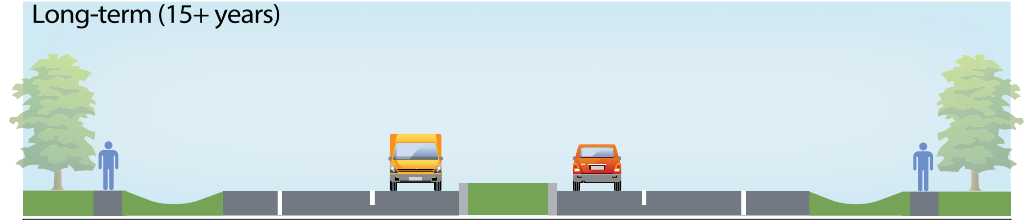
SH 3 - FM 646 to SH 96

Existing

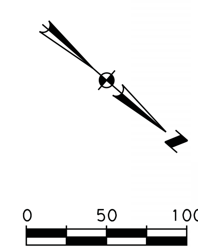


Buffer with Drainage Swale	Shoulder	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Shoulder	Buffer with Drainage Swale
32'	10'	12'	12'	18'	12'	12'	10'	32'
150' ROW								

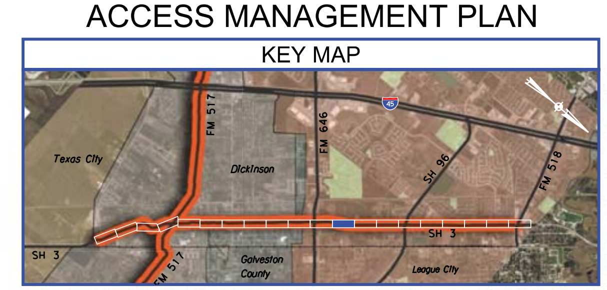
Long-term (15+ years)



Sidewalk & Buffer with Drainage Swale	Shoulder	Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane	Shoulder	Sidewalk & Buffer with Drainage Swale
30'	10'	14'	12'	18'	12'	14'	10'	30'
150' ROW								



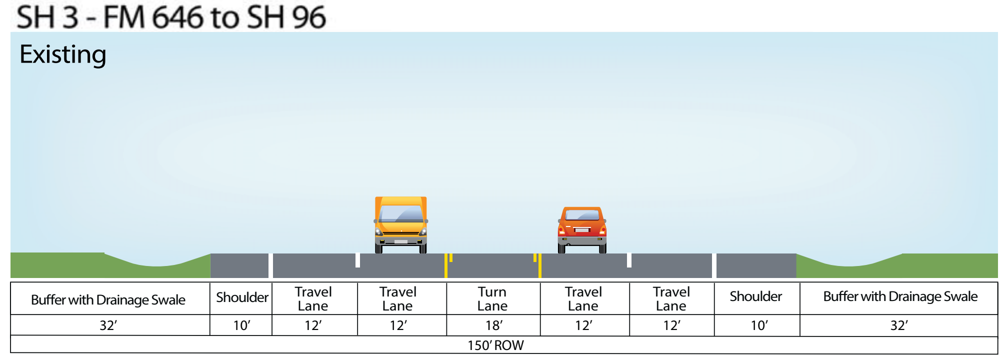
FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

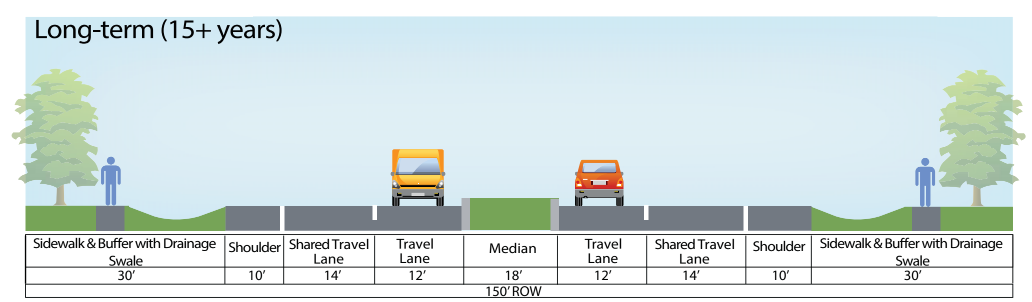


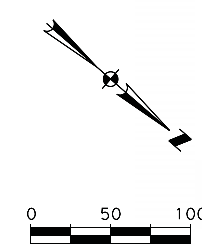
LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

SH 3 - FM 646 to SH 96

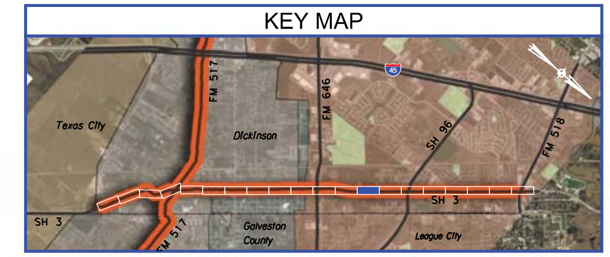


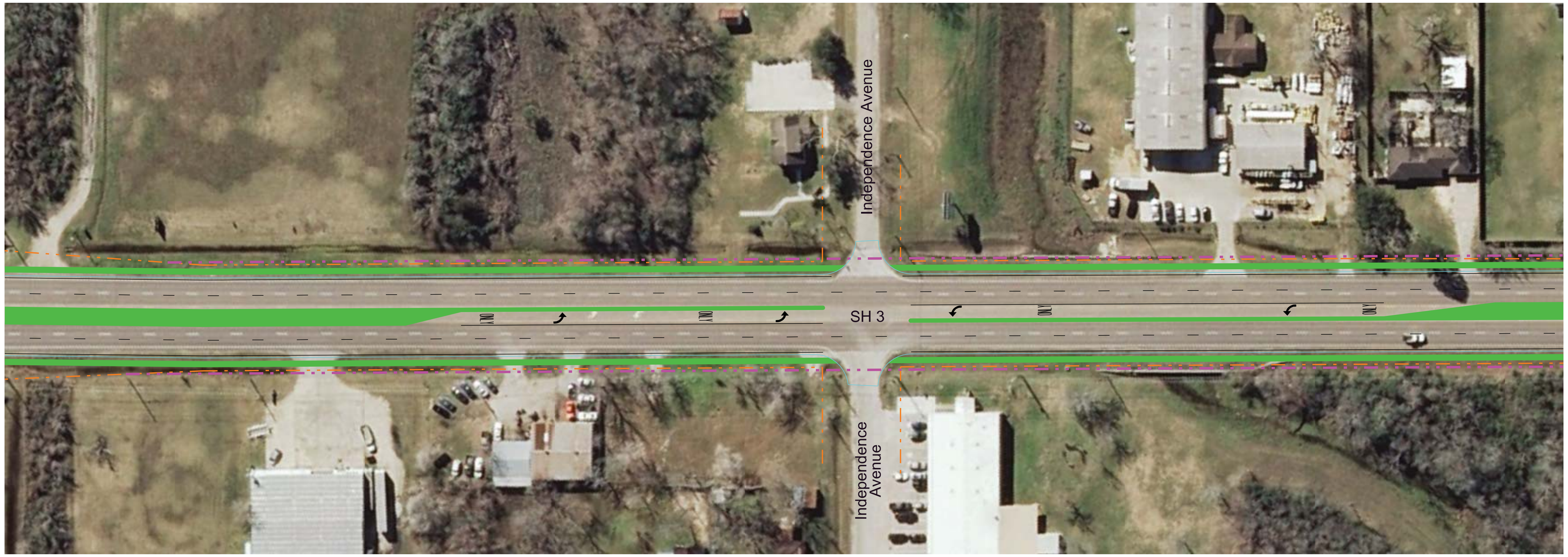




FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



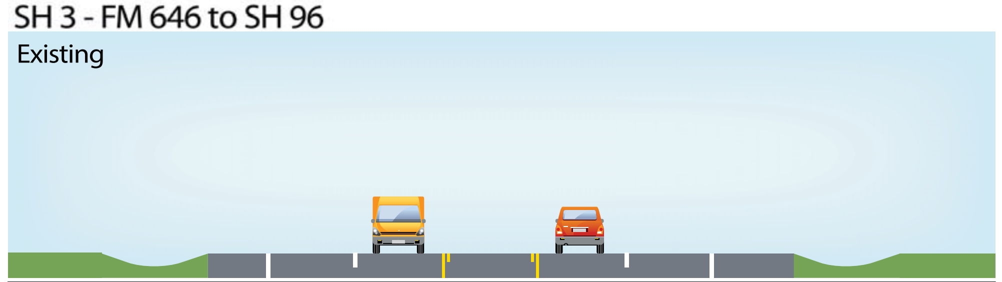


LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

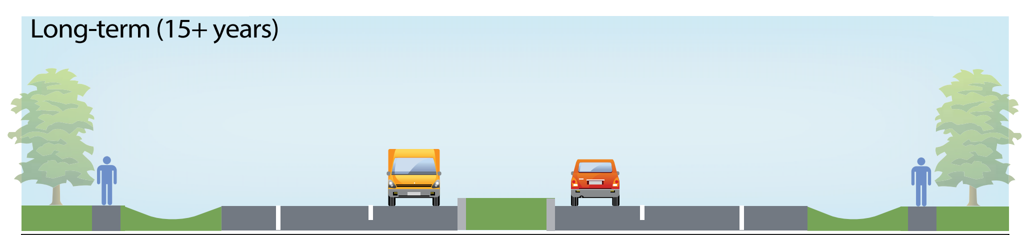
SH 3 - FM 646 to SH 96

Existing

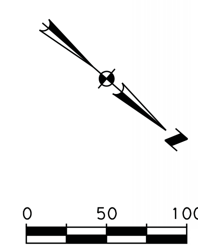


Buffer with Drainage Swale	Shoulder	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Shoulder	Buffer with Drainage Swale
32'	10'	12'	12'	18'	12'	12'	10'	32'
150' ROW								

Long-term (15+ years)

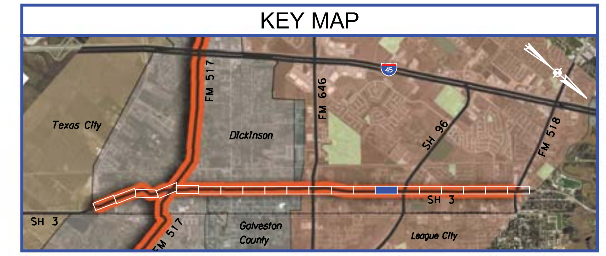


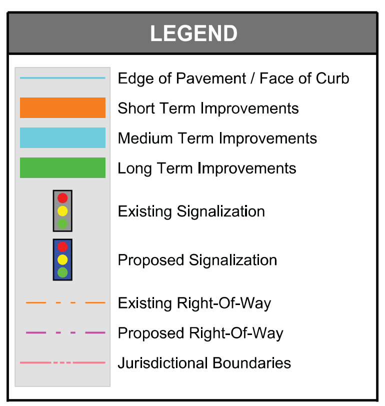
Sidewalk & Buffer with Drainage Swale	Shoulder	Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane	Shoulder	Sidewalk & Buffer with Drainage Swale
30'	10'	14'	12'	18'	12'	14'	10'	30'
150' ROW								



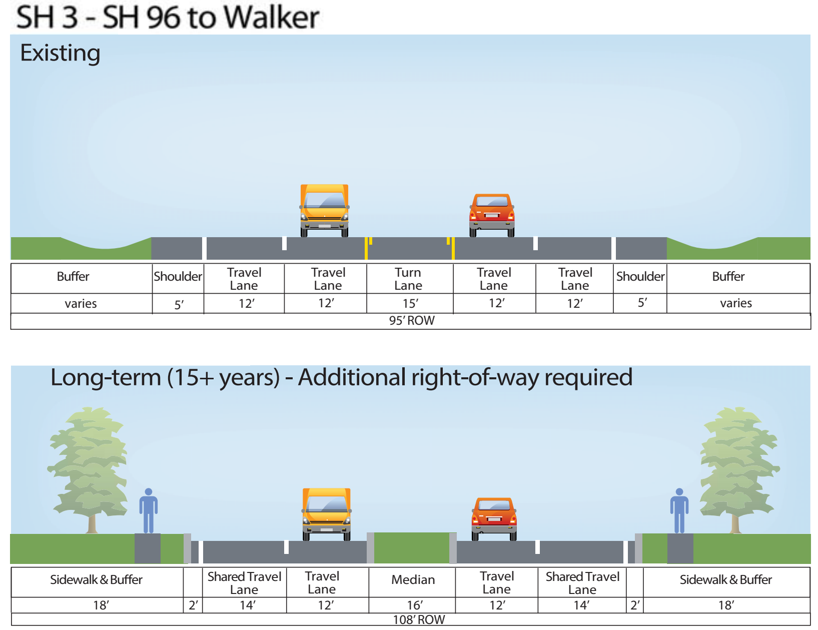
FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

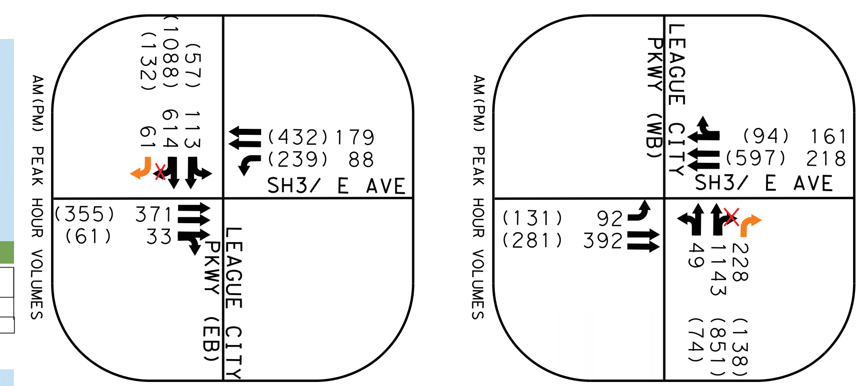
KEY MAP

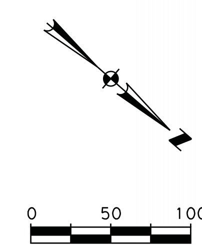




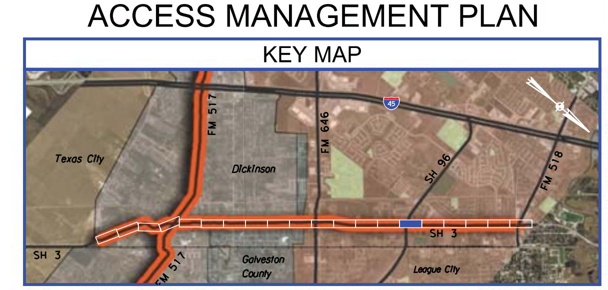
SH 3 - SH 96 to Walker







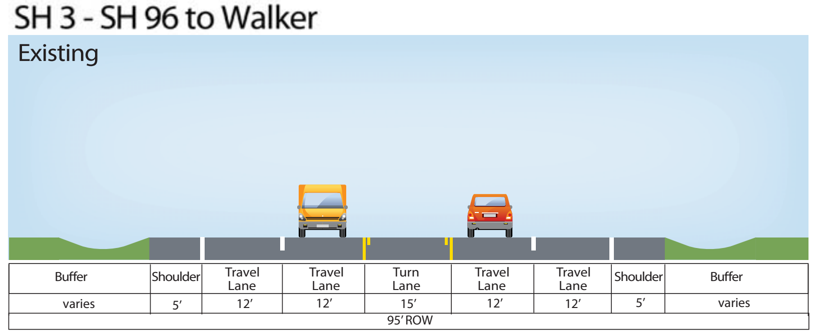
FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

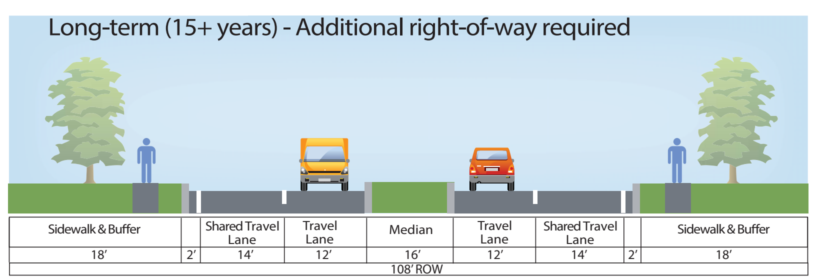


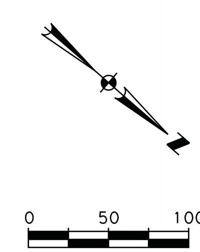
LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

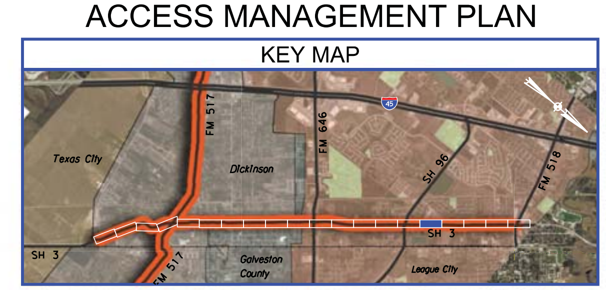
SH 3 - SH 96 to Walker







FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

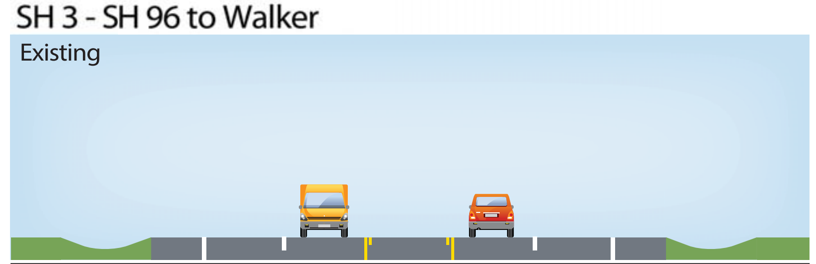


LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

SH 3 - SH 96 to Walker

Existing



Buffer	Shoulder	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Shoulder	Buffer
varies	5'	12'	12'	15'	12'	12'	5'	varies
95' ROW								

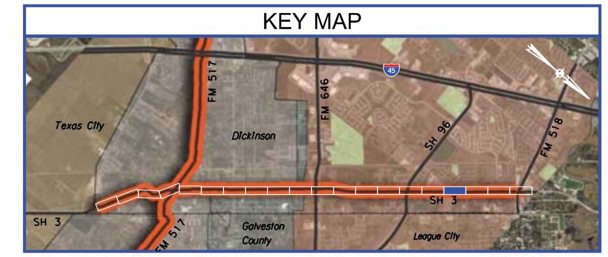
Long-term (15+ years) - Additional right-of-way required

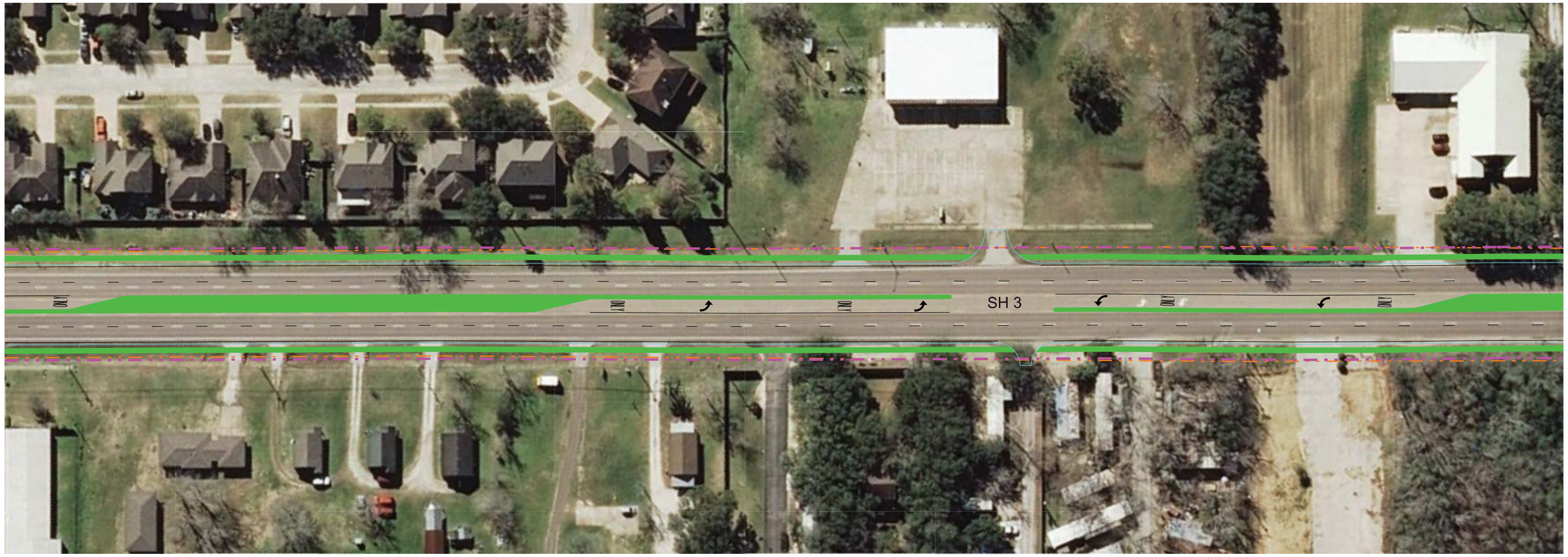
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
18'	2'	14'	12'	16'	12'	14'	2'	18'
108' ROW								

0 50 100
SCALE: 1" = 100'

FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

KEY MAP



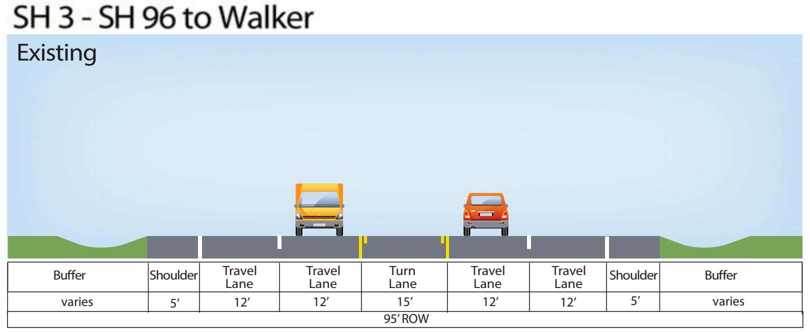


LEGEND

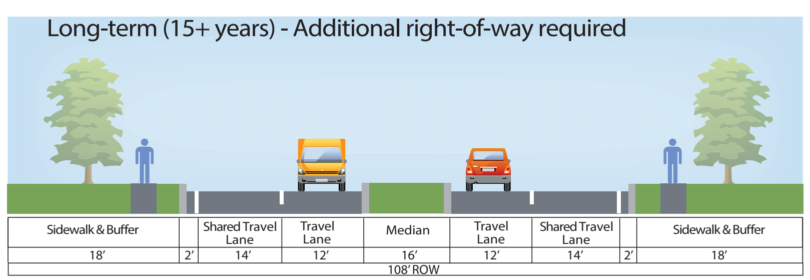
- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

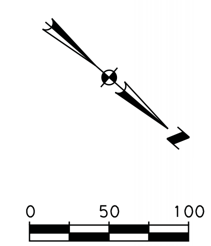
SH 3 - SH 96 to Walker

Existing



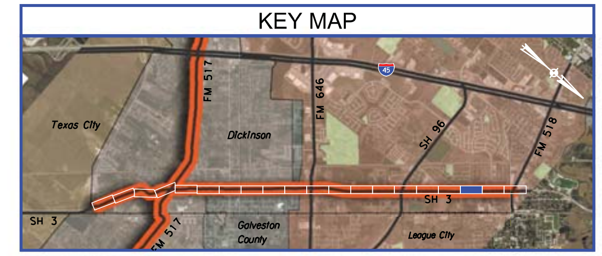
Long-term (15+ years) - Additional right-of-way required

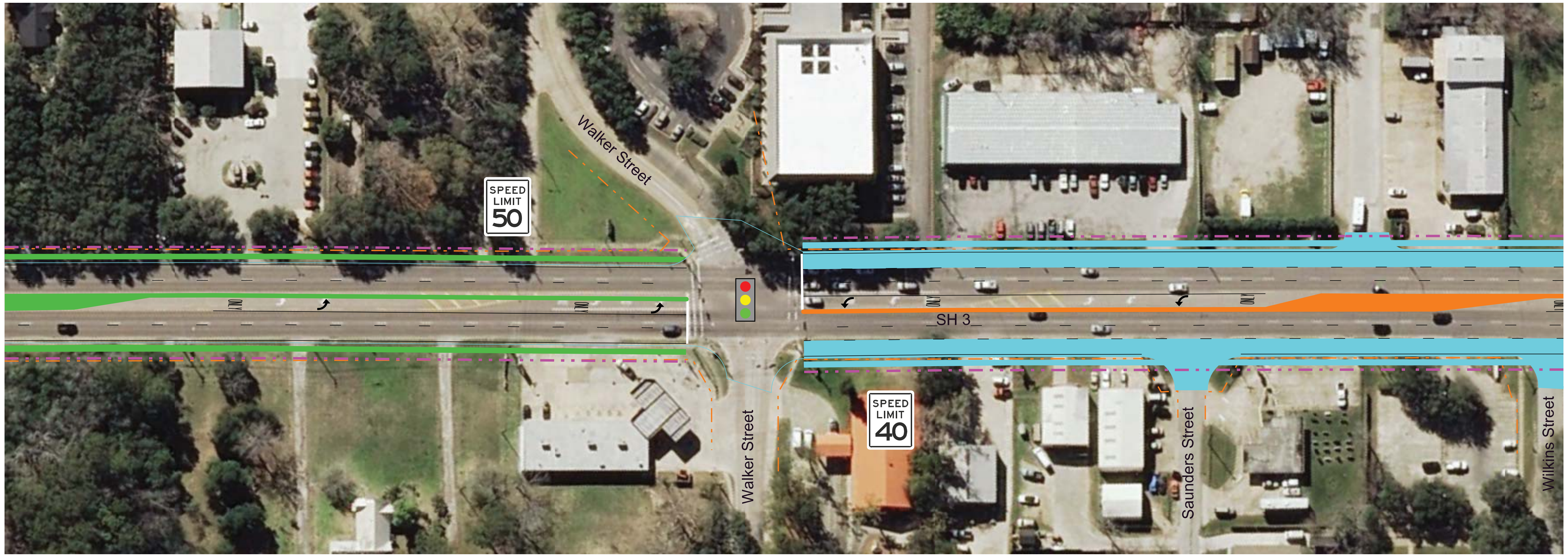




FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



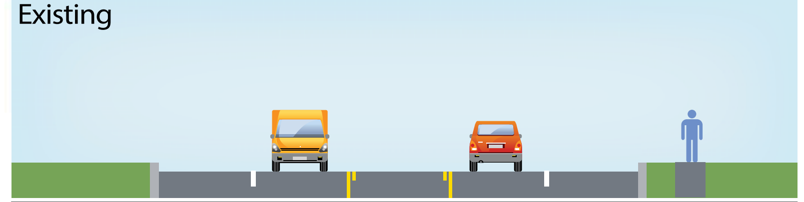


LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

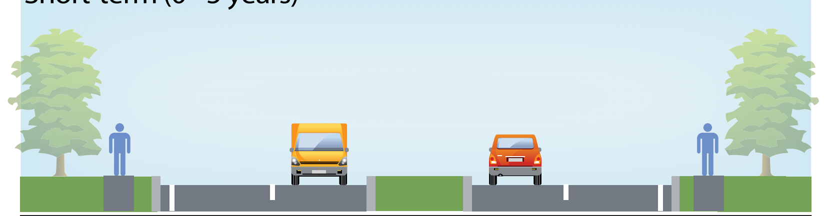
SH 3 - Walker to FM 518

Existing



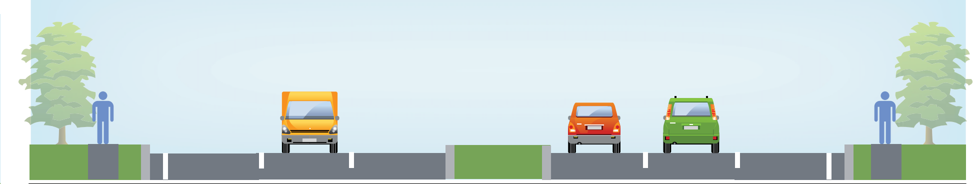
Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
17'	14'	12'	16'	12'	14'	20'
105' ROW						

Short-term (0 - 5 years)

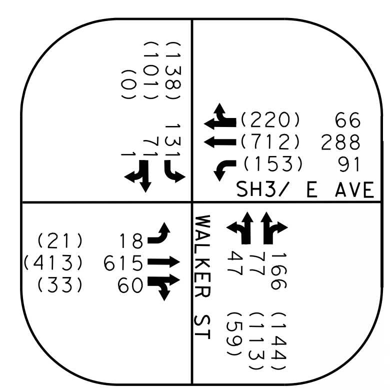


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	18'
105' ROW								

Medium-term (5 - 15 years) - additional right-of-way required



Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	12'	18'	12'	12'	14'	2'	15'
128' ROW										

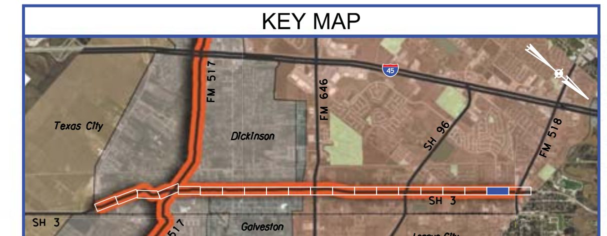


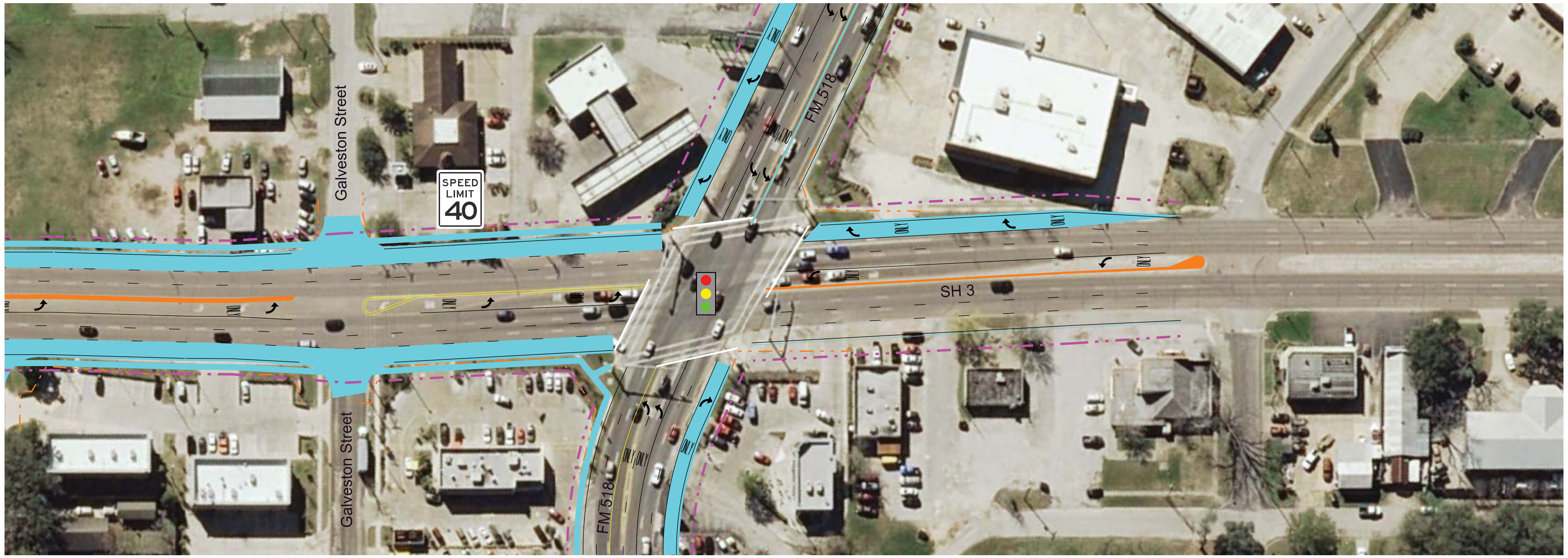
AM(PM) PEAK HOUR VOLUMES

0 50 100
SCALE: 1" = 100'

FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

KEY MAP



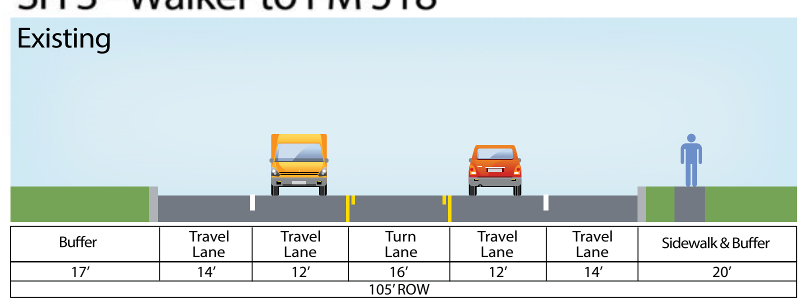


LEGEND

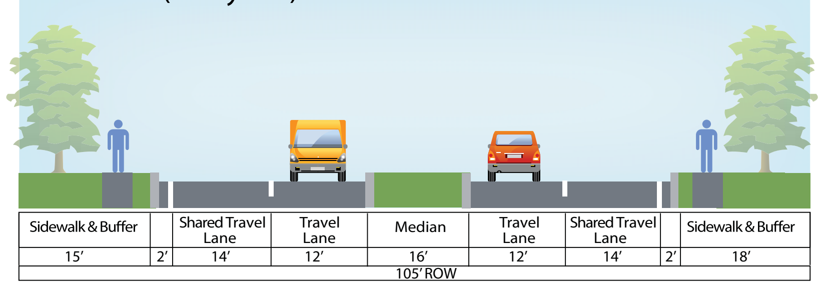
- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

SH 3 - Walker to FM 518

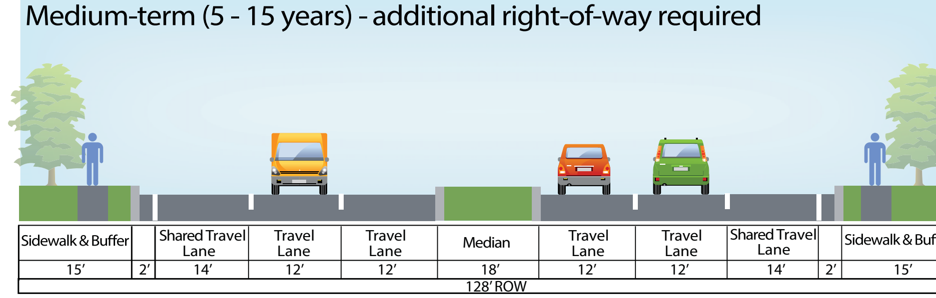
Existing

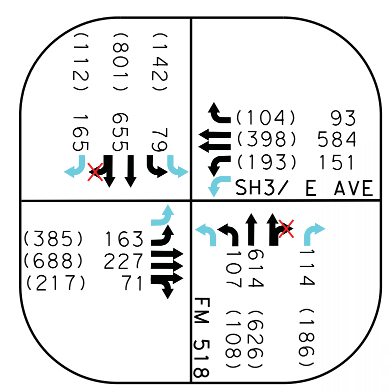


Short-term (0 - 5 years)



Medium-term (5 - 15 years) - additional right-of-way required

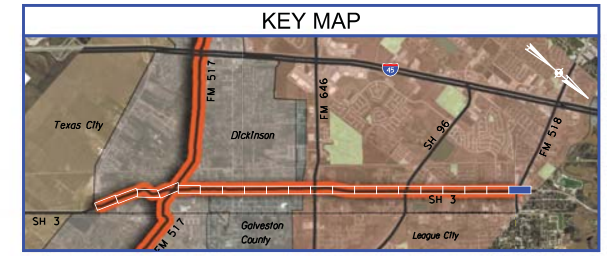




0 50 100
SCALE: 1" = 100'

FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

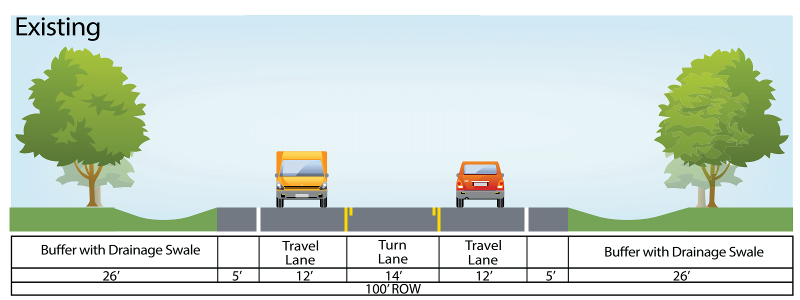
KEY MAP

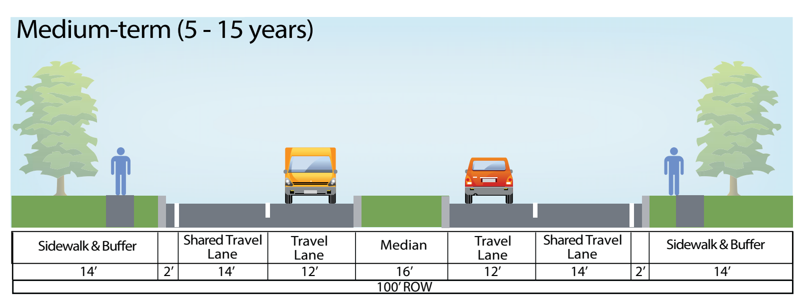


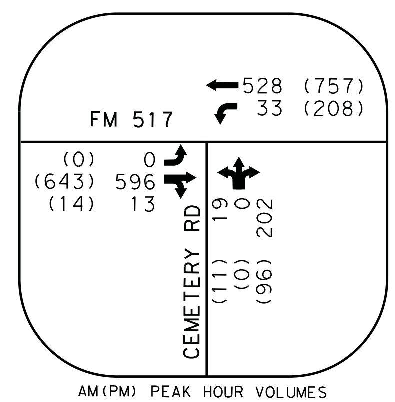
LEGEND

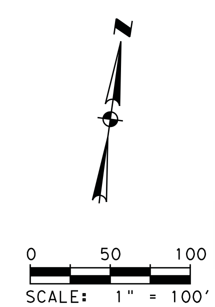
- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

FM517 - Cemetery to FM 646







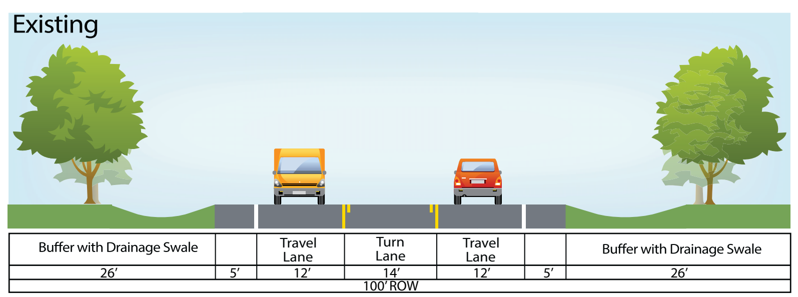


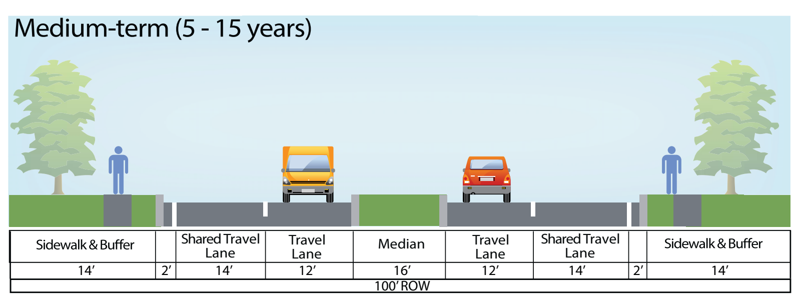
FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

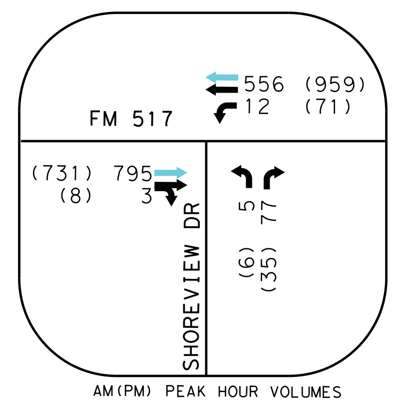
LEGEND

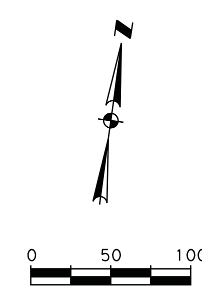
- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

FM517 - Cemetery to FM 646









FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
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- Existing Signalization
- Proposed Signalization
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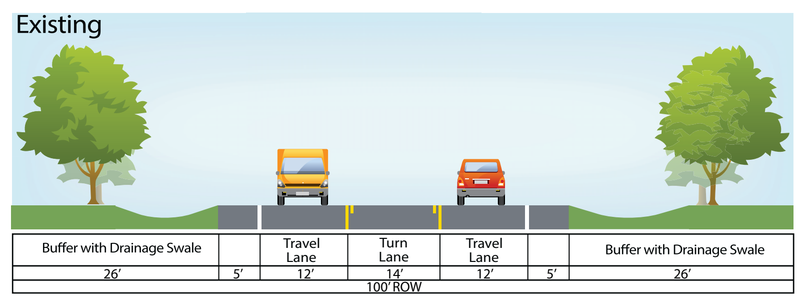
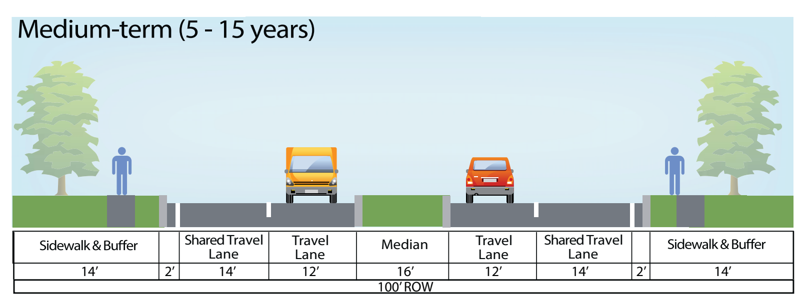
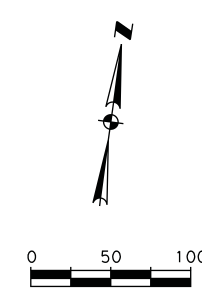
- Proposed Right-Of-Way
- Jurisdictional Boundaries

FM517 - Cemetery to FM 646







FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
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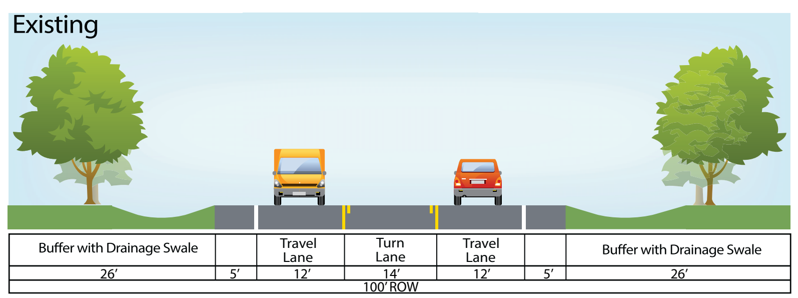
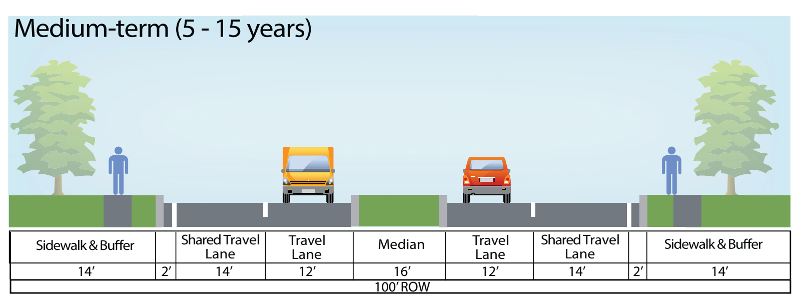
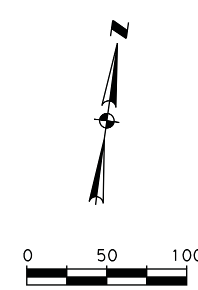
FM517 - Cemetery to FM 646







FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
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- Existing Signalization
- Proposed Signalization
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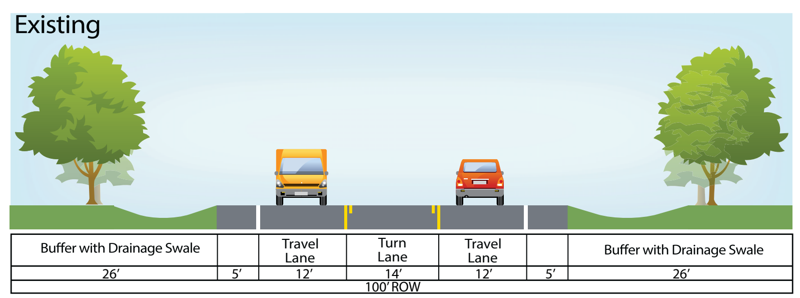
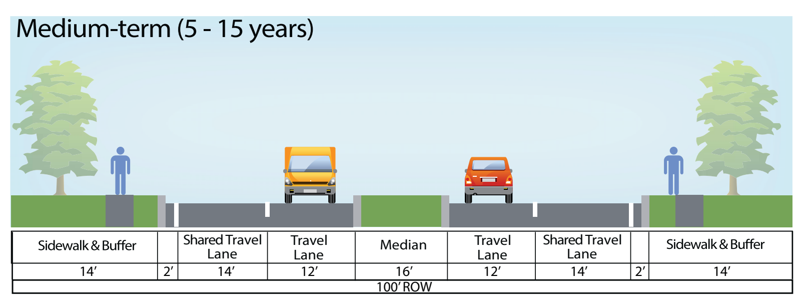
- Proposed Right-Of-Way
- Jurisdictional Boundaries

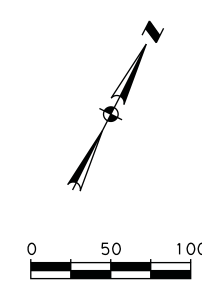
FM517 - Cemetery to FM 646

Existing



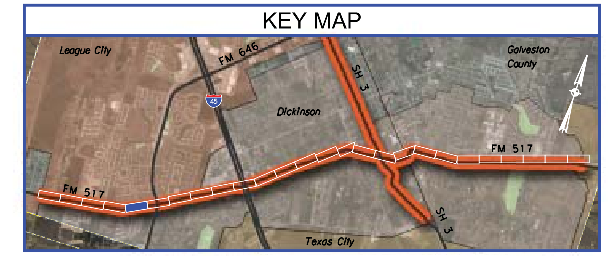
Medium-term (5 - 15 years)



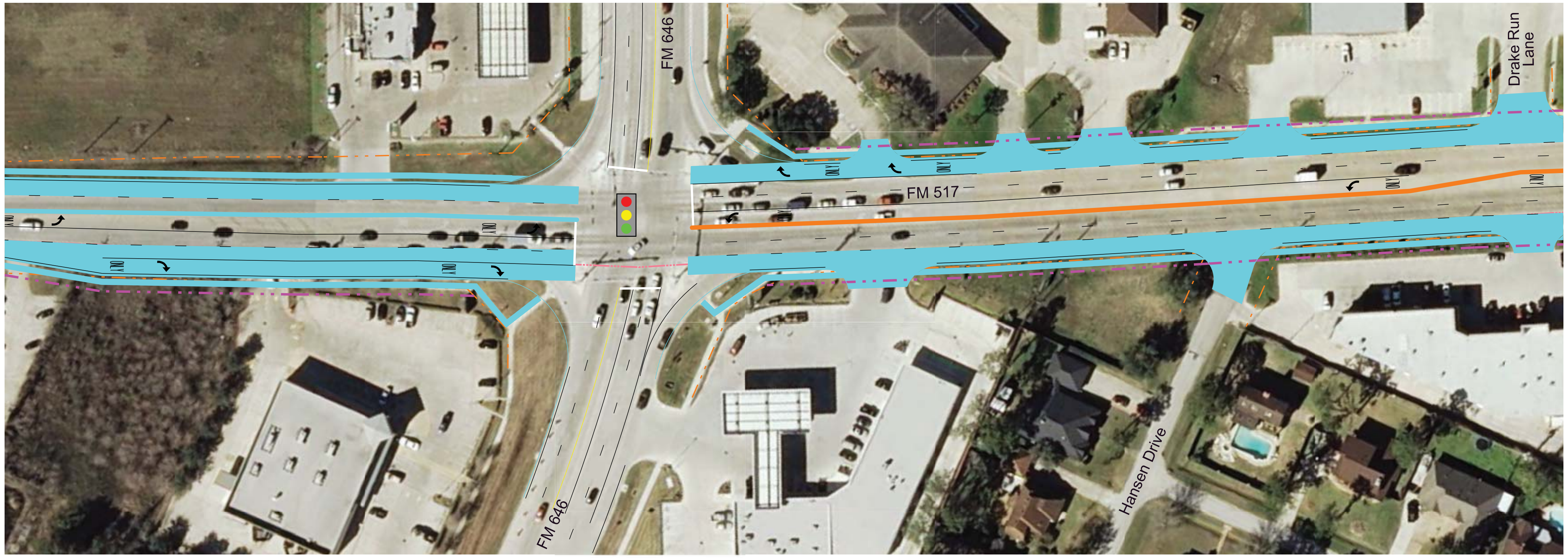


FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP

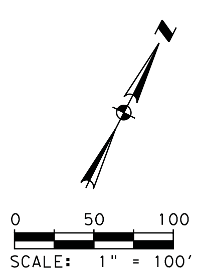


FM 517 and SH 3
Access Management Plan

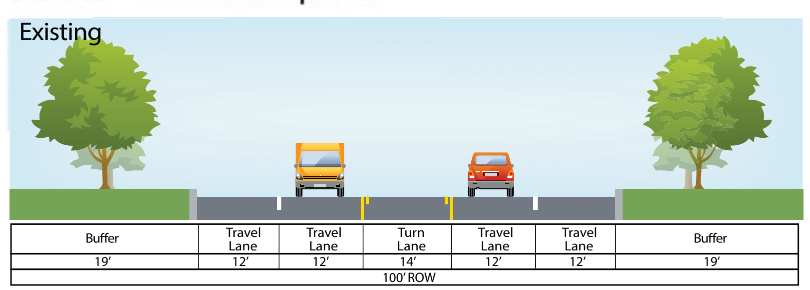


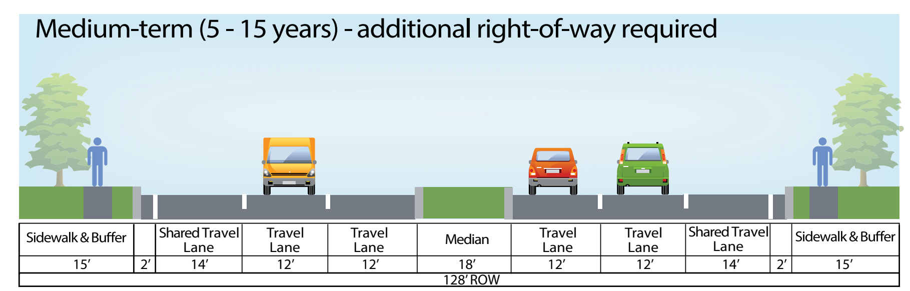
LEGEND

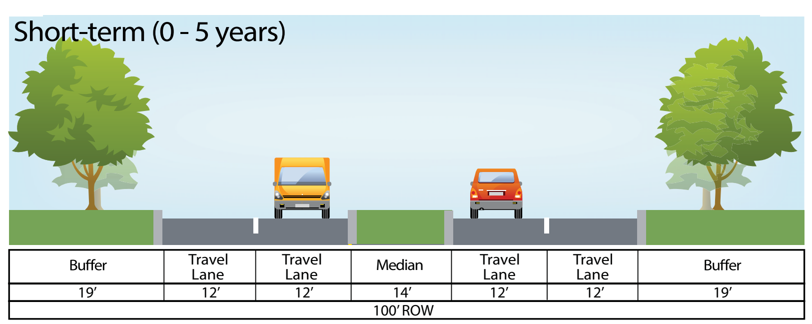
- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

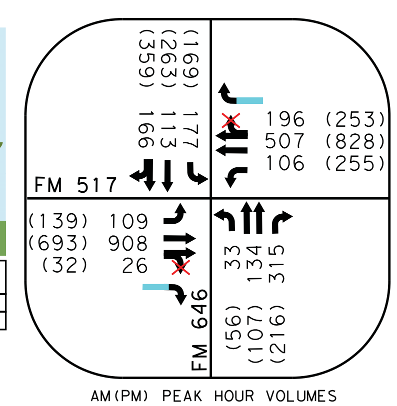


FM517 - FM 646 to Spruce Dr



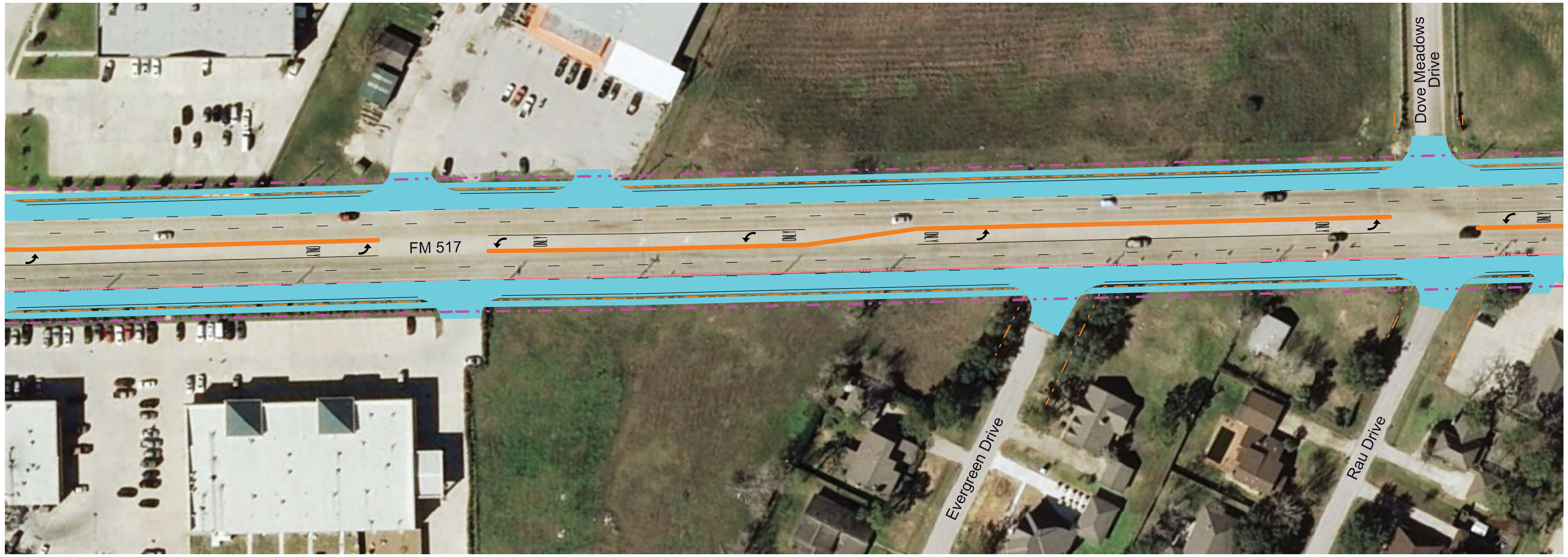






FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
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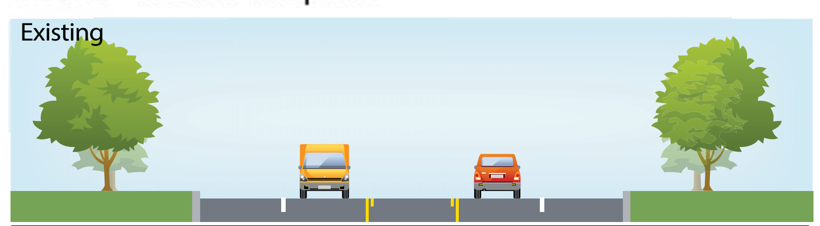
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

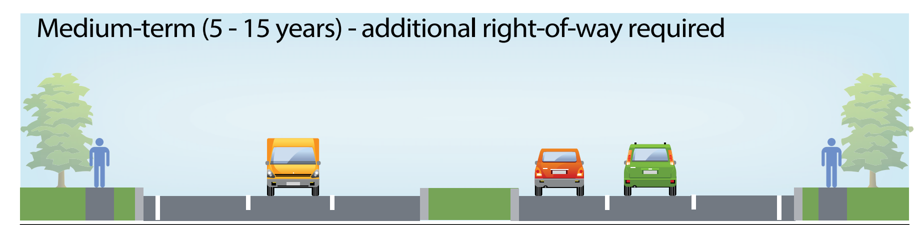
FM517 - FM 646 to Spruce Dr

Existing



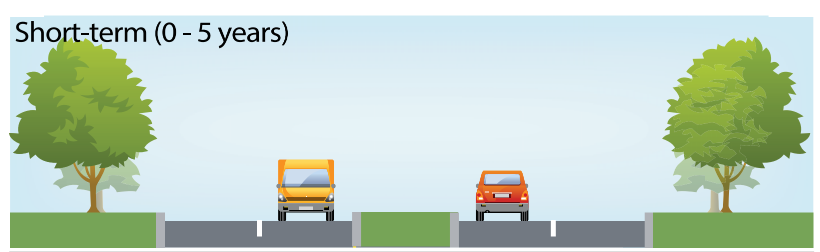
Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Buffer
19'	12'	12'	14'	12'	12'	19'
100' ROW						

Medium-term (5 - 15 years) - additional right-of-way required

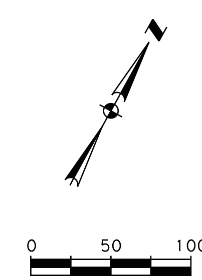


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	12'	18'	12'	12'	14'	2'	15'
128' ROW										

Short-term (0 - 5 years)

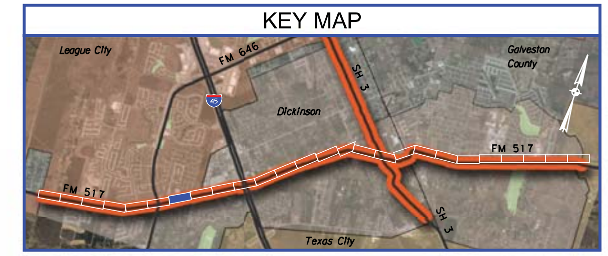


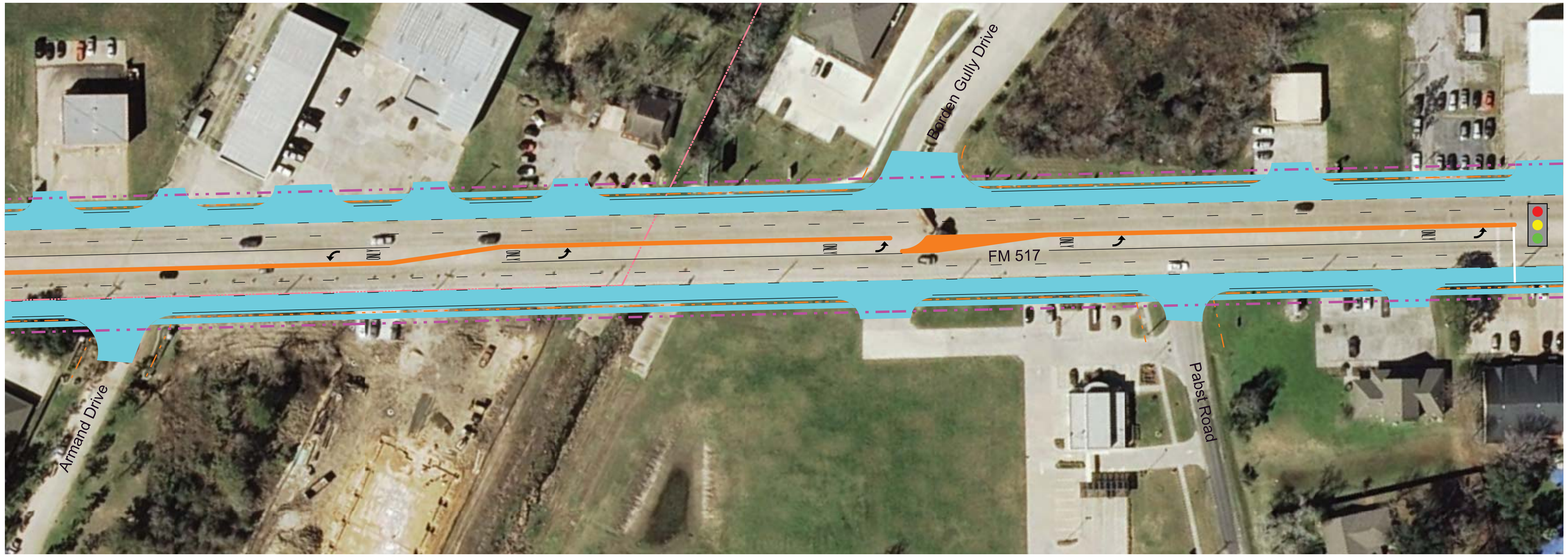
Buffer	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Buffer
19'	12'	12'	14'	12'	12'	19'
100' ROW						



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP





LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
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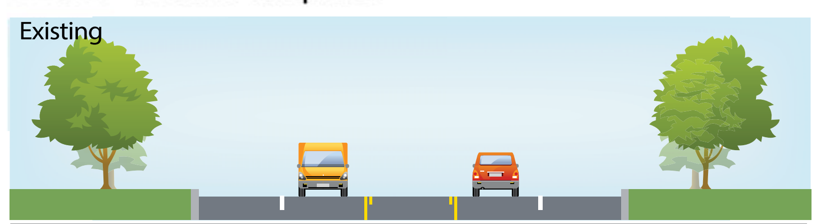
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

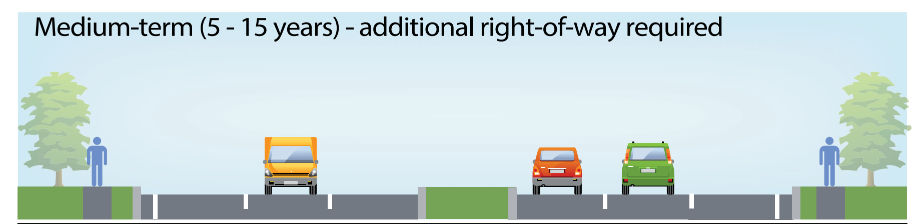
FM517 - FM 646 to Spruce Dr

Existing



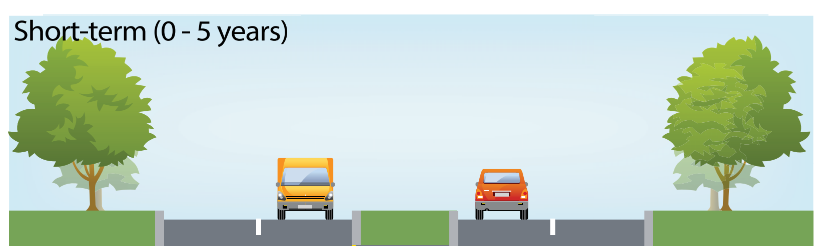
Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Buffer
19'	12'	12'	14'	12'	12'	19'
100' ROW						

Medium-term (5 - 15 years) - additional right-of-way required

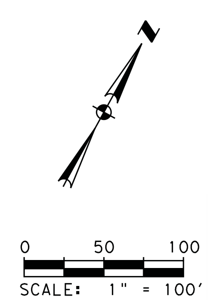


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	12'	18'	12'	12'	14'	2'	15'
128' ROW										

Short-term (0 - 5 years)

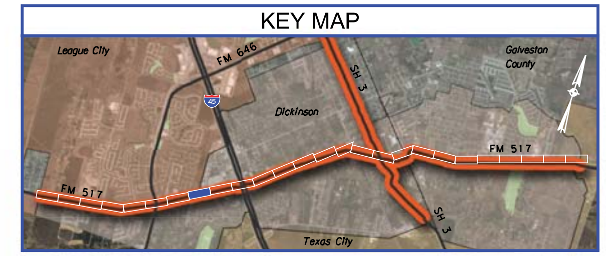


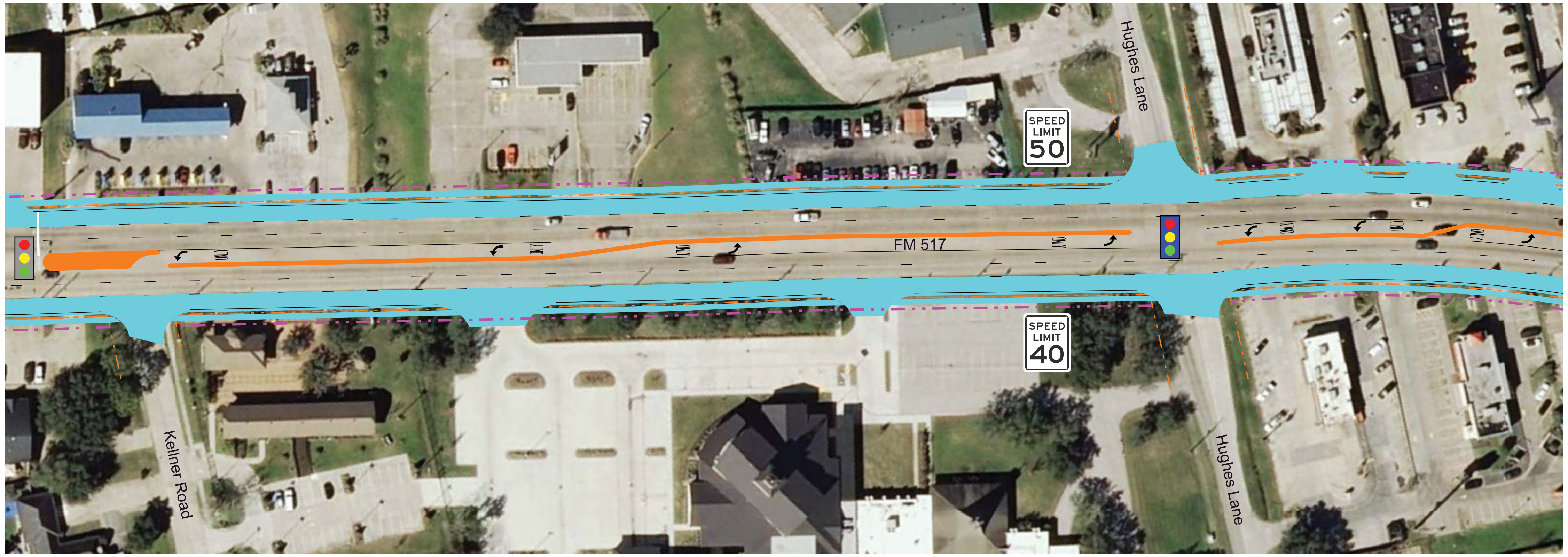
Buffer	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Buffer
19'	12'	12'	14'	12'	12'	19'
100' ROW						



FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

KEY MAP



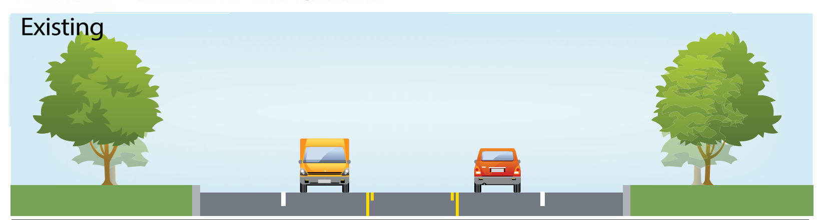


LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

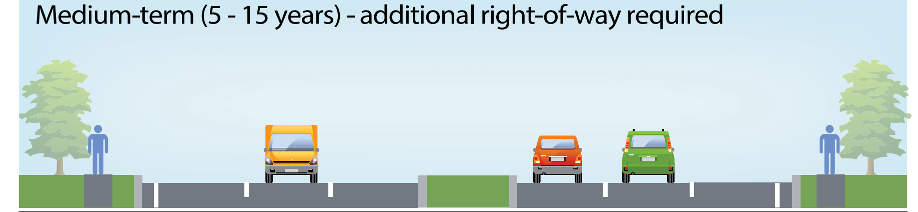
FM517 - FM 646 to Spruce Dr

Existing



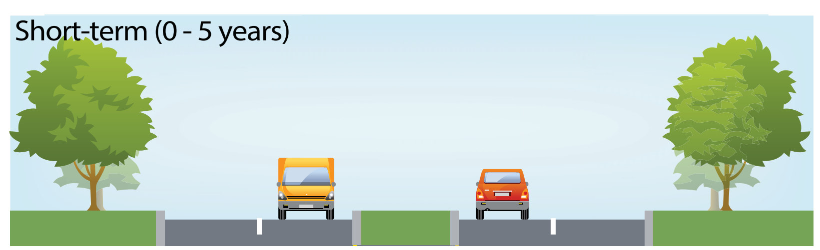
Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Buffer
19'	12'	12'	14'	12'	12'	19'
100' ROW						

Medium-term (5 - 15 years) - additional right-of-way required

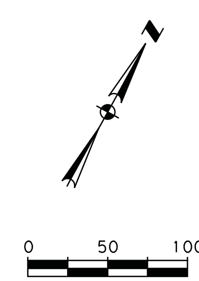


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	12'	18'	12'	12'	14'	2'	15'
128' ROW										

Short-term (0 - 5 years)

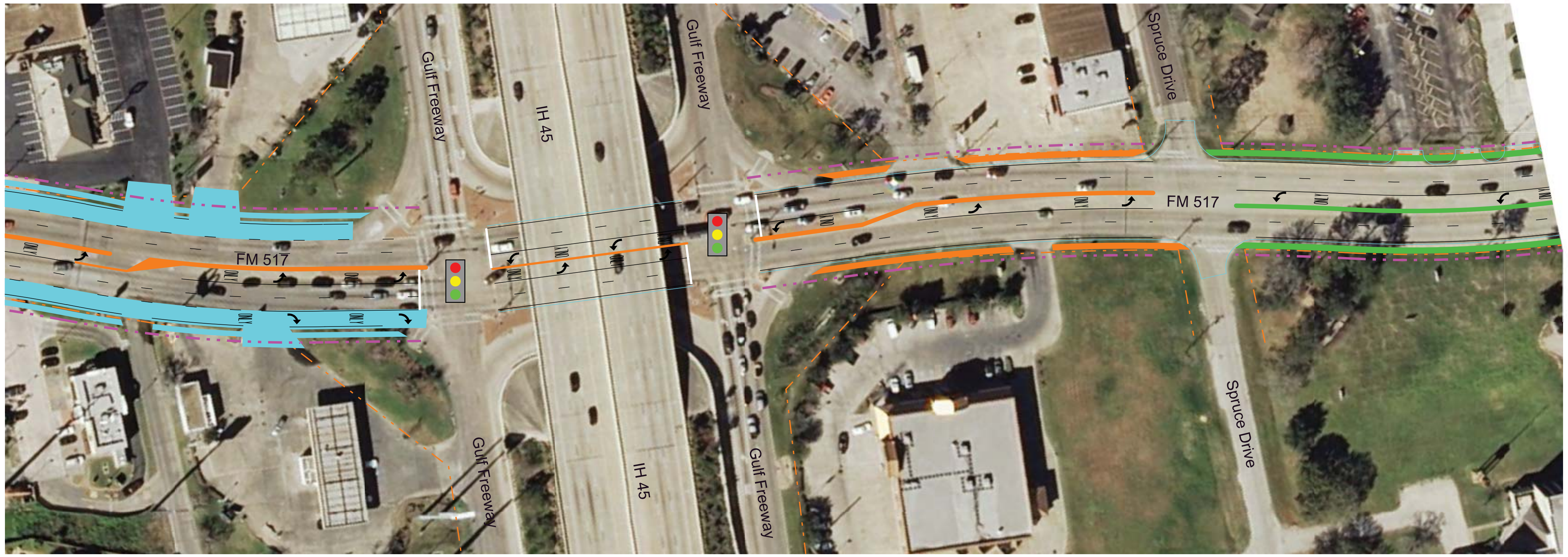


Buffer	Travel Lane	Travel Lane	Median	Travel Lane	Travel Lane	Buffer
19'	12'	12'	14'	12'	12'	19'
100' ROW						



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
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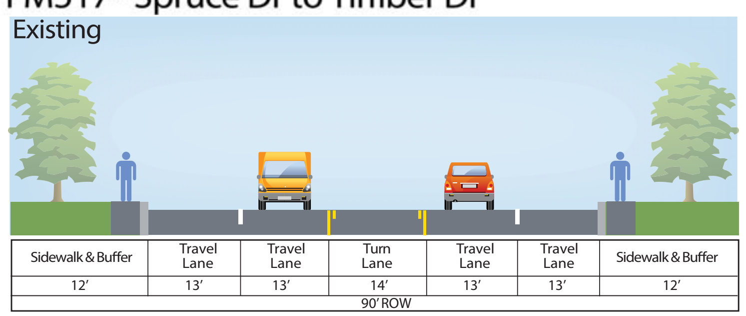
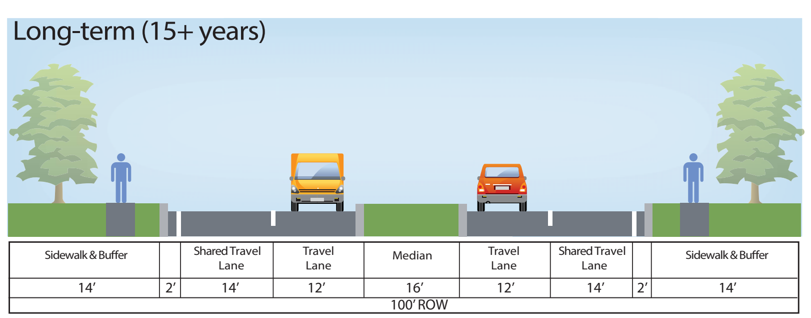
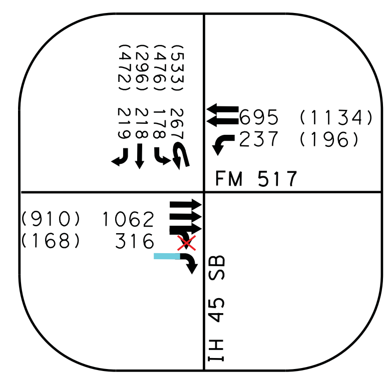
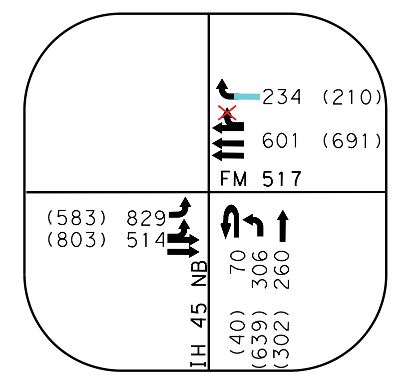
FM517 - Spruce Dr to Timber Dr



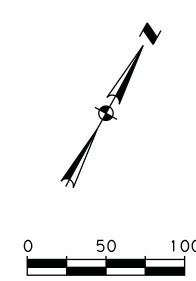




AM(PM) PEAK HOUR VOLUMES

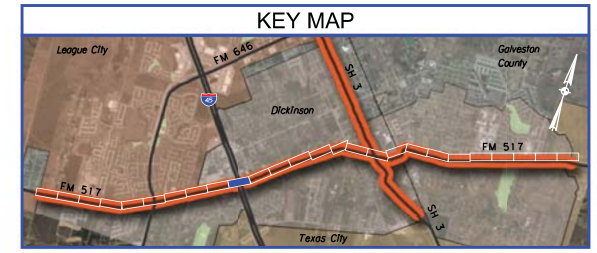


AM(PM) PEAK HOUR VOLUMES



FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

KEY MAP



LEGEND

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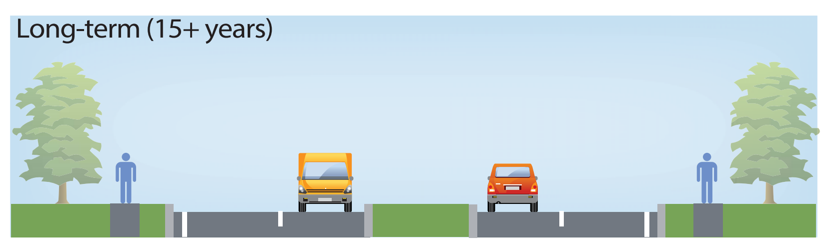
- Jurisdictional Boundaries

FM517 - Spruce Dr to Timber Dr

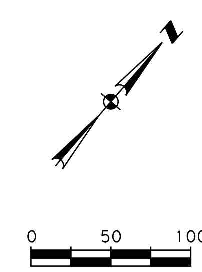
Existing

Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

Long-term (15+ years)

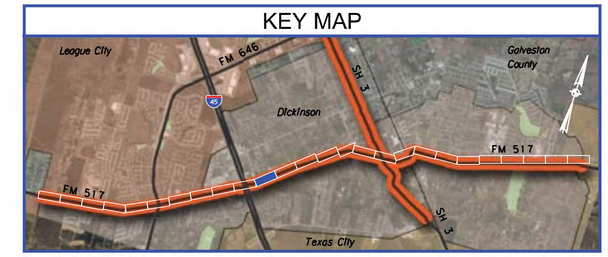


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
14'	2'	14'	12'	16'	12'	14'	2'	14'
100' ROW								



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



LEGEND

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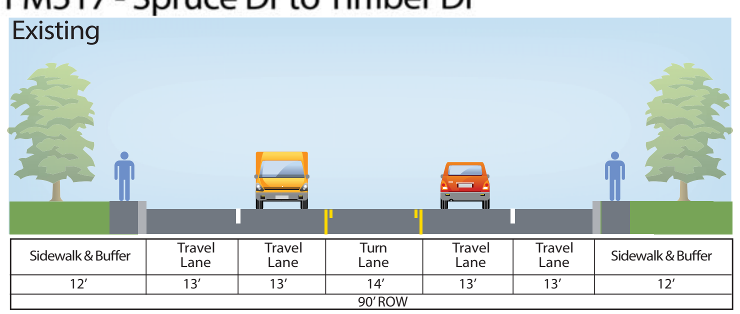
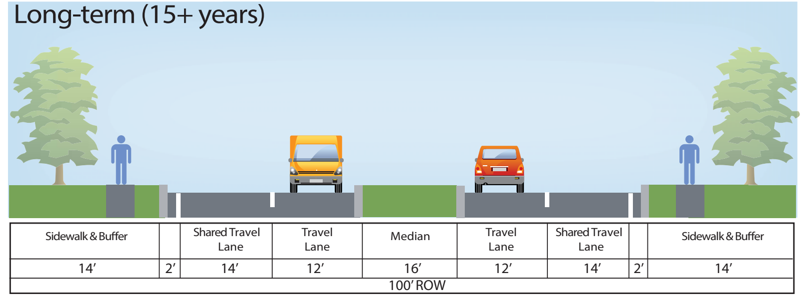
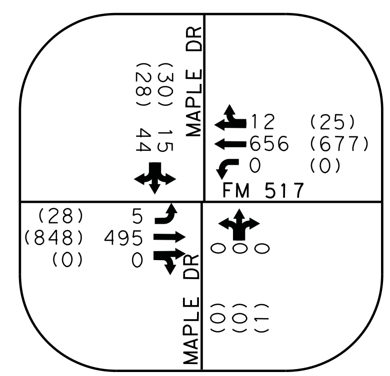
FM517 - Spruce Dr to Timber Dr

Existing

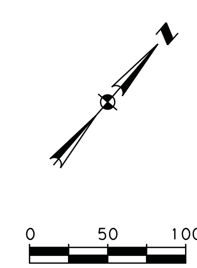


Long-term (15+ years)





AM(PM) PEAK HOUR VOLUMES



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

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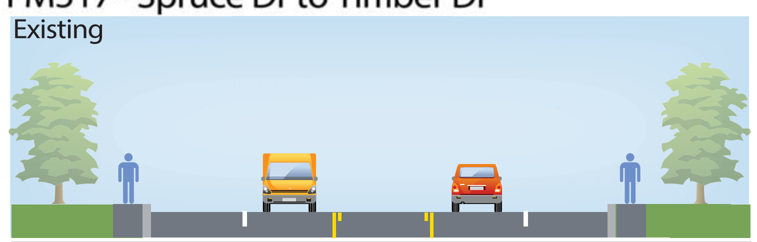
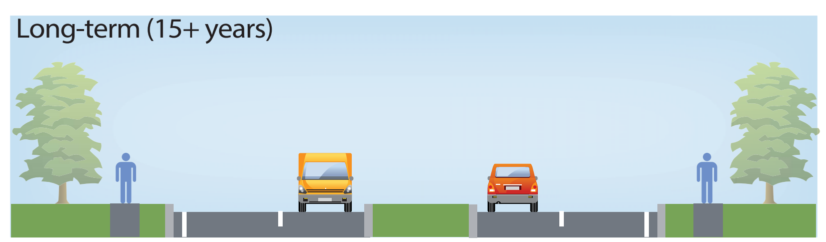
FM517 - Spruce Dr to Timber Dr

Existing

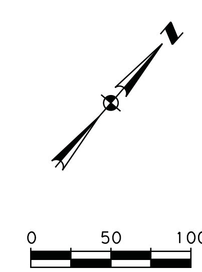


Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

Long-term (15+ years)

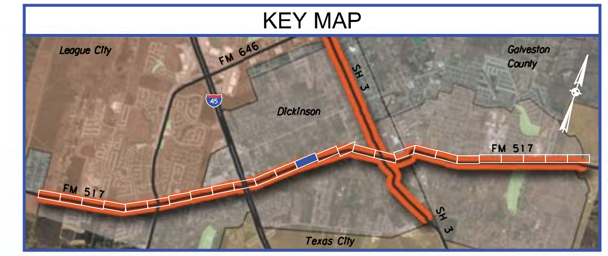


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
14'	2'	14'	12'	16'	12'	14'	2'	14'
100' ROW								



FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

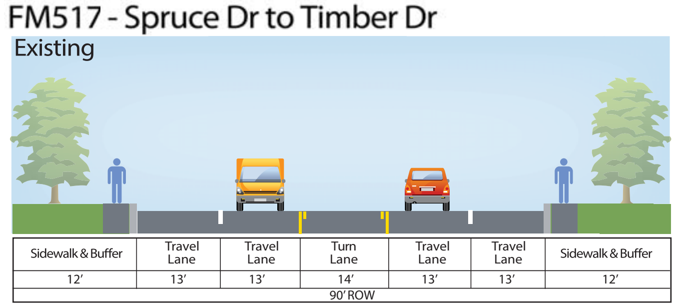
KEY MAP

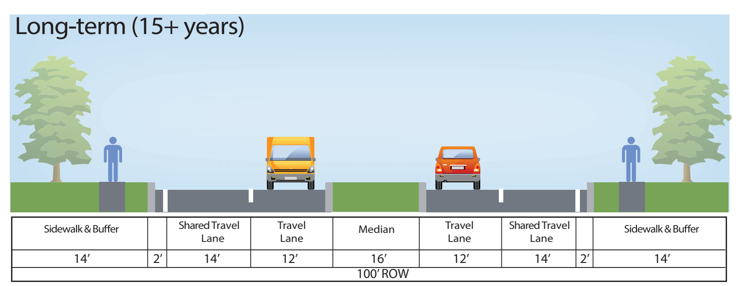


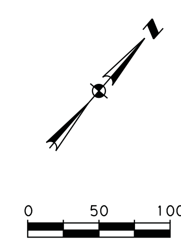
LEGEND

- Edge of Pavement / Face of Curb
- Short Term Improvements
- Medium Term Improvements
- Long Term Improvements
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries

FM517 - Spruce Dr to Timber Dr

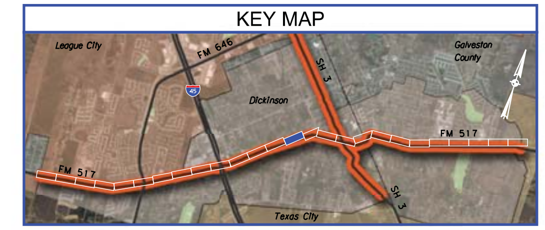






FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

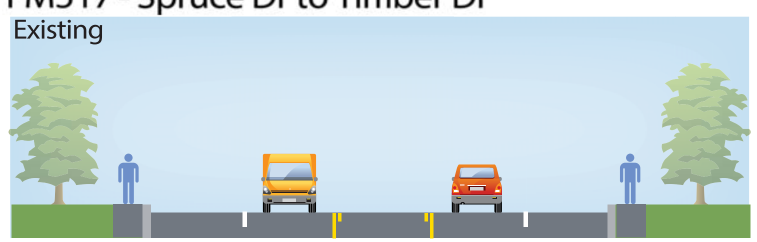
KEY MAP



LEGEND
Edge of Pavement / Face of Curb
Short Term Improvements
Medium Term Improvements
Long Term Improvements
Existing Signalization
Proposed Signalization
Existing Right-Of-Way
Proposed Right-Of-Way
Jurisdictional Boundaries

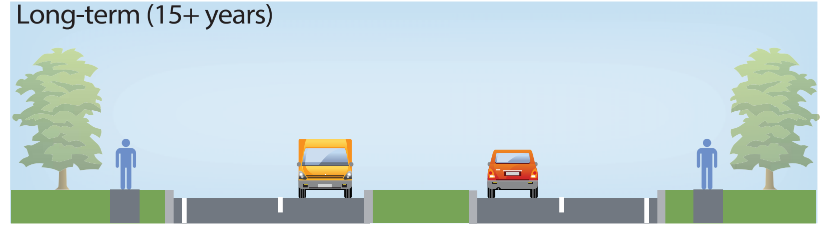
FM517 - Spruce Dr to Timber Dr

Existing

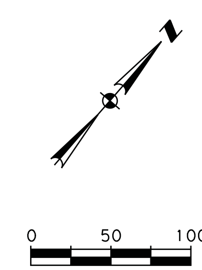


Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

Long-term (15+ years)

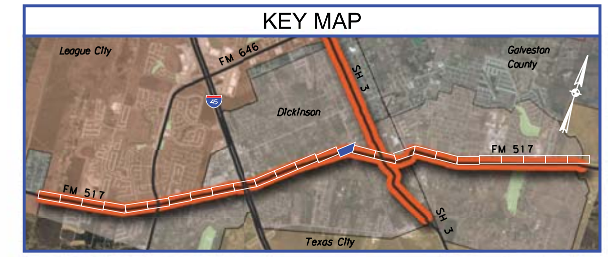


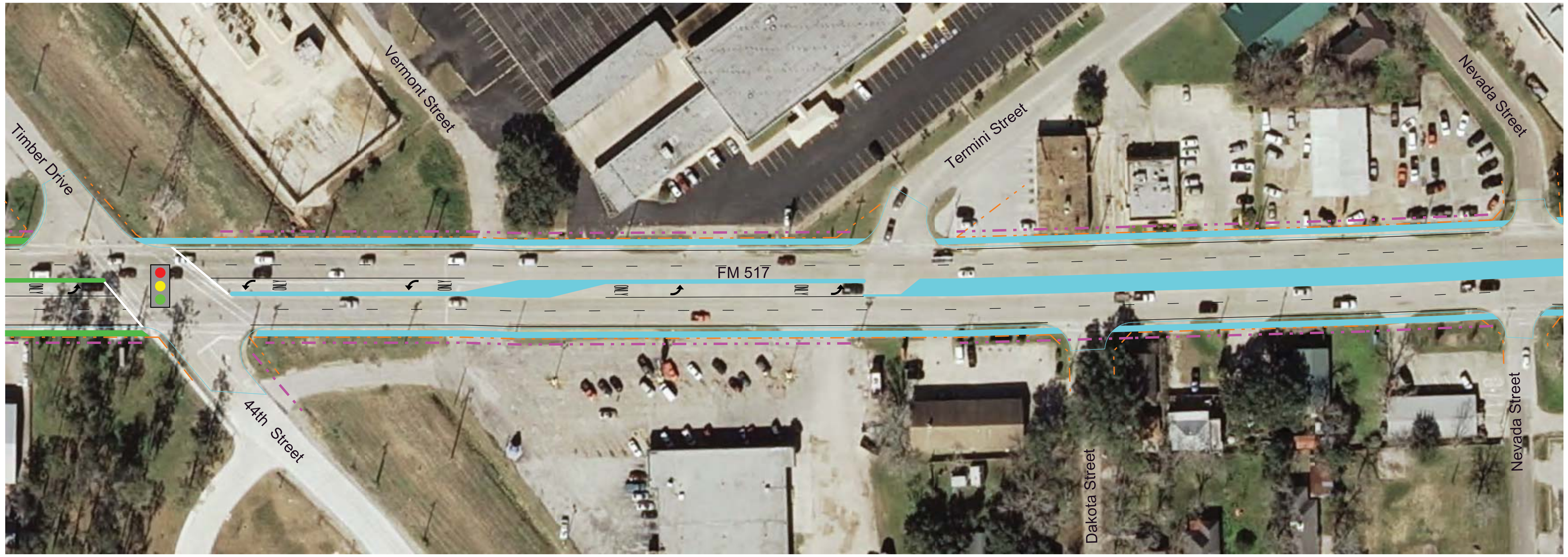
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
14'	2'	14'	12'	16'	12'	14'	2'	14'
100' ROW								



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP





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- Proposed Right-Of-Way
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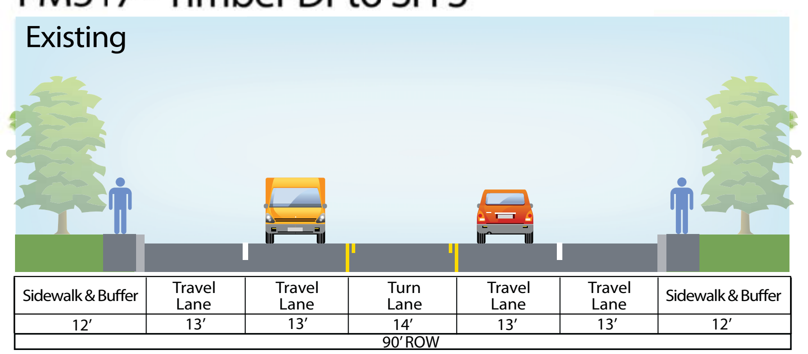
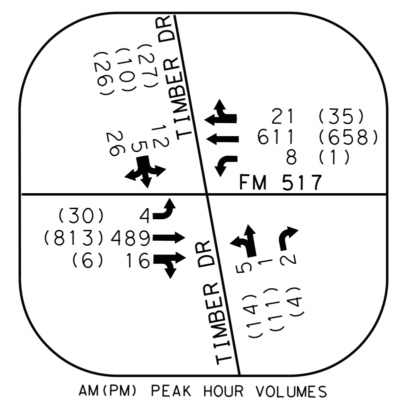
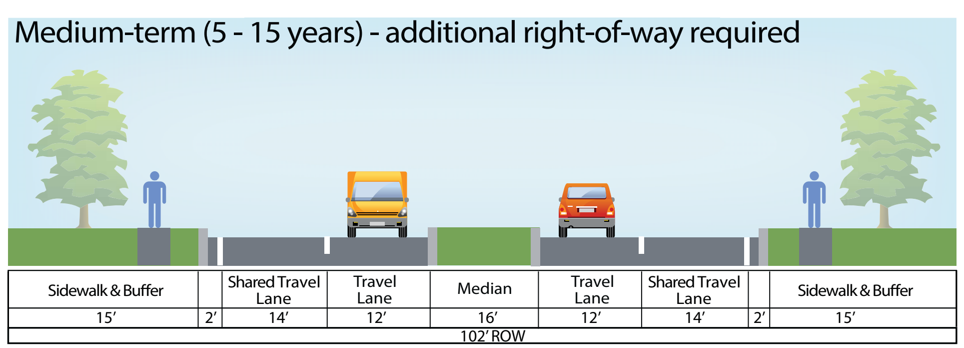
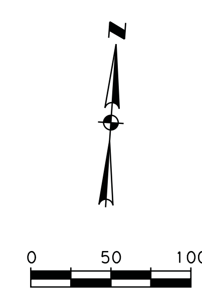
FM517 - Timber Dr to SH 3









FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

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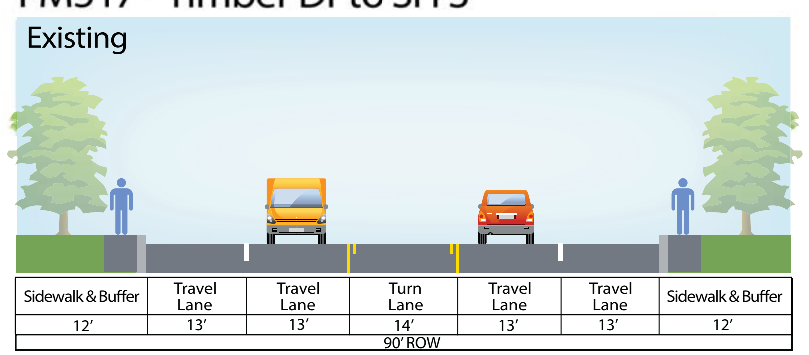
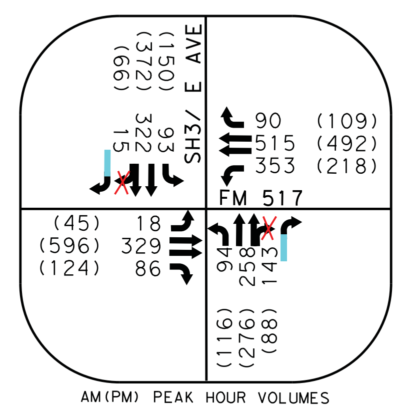
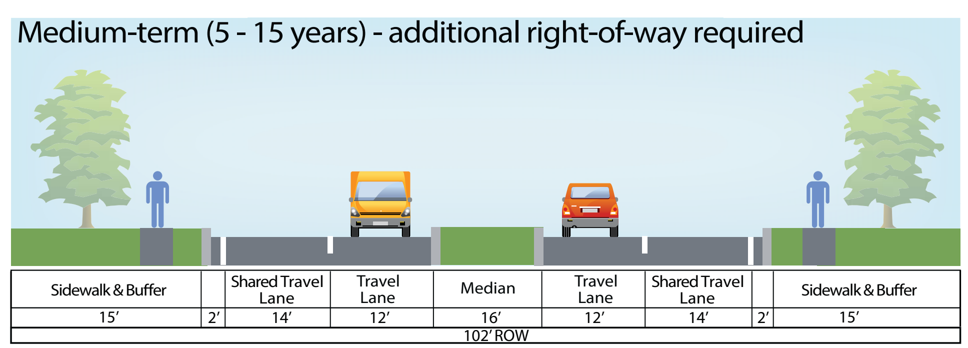
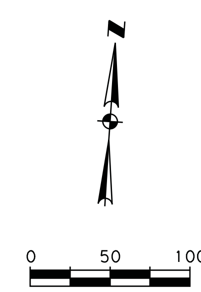
FM517 - Timber Dr to SH 3









FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

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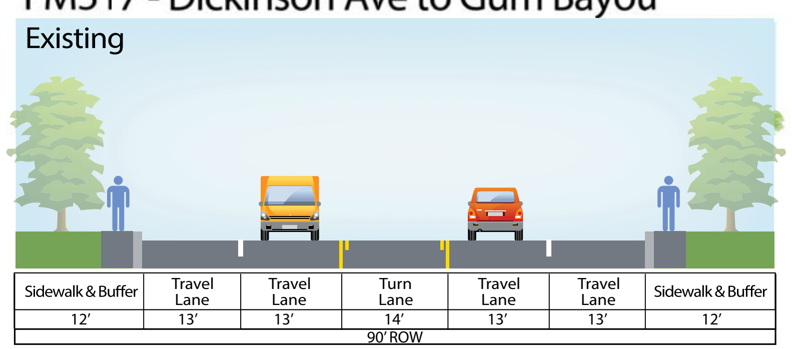
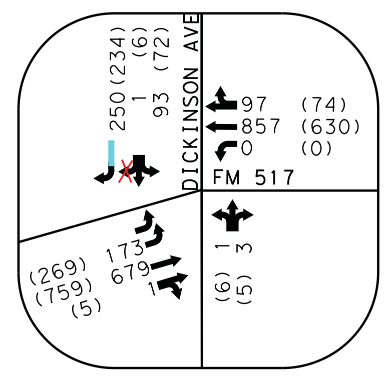
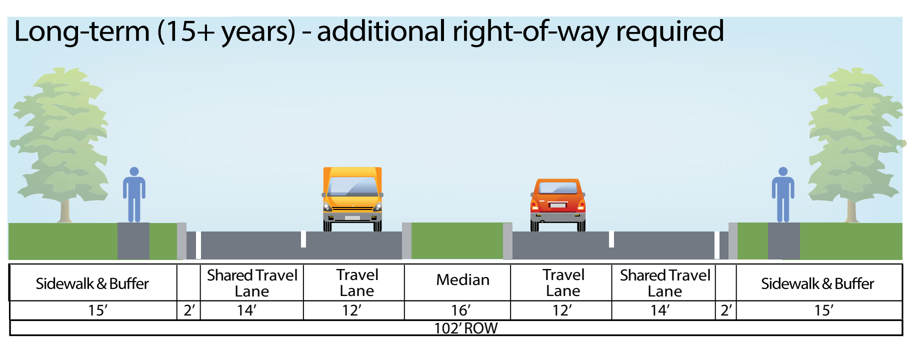
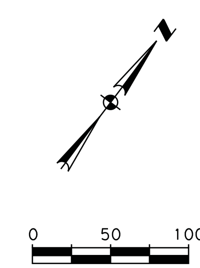
FM517 - Dickinson Ave to Gum Bayou



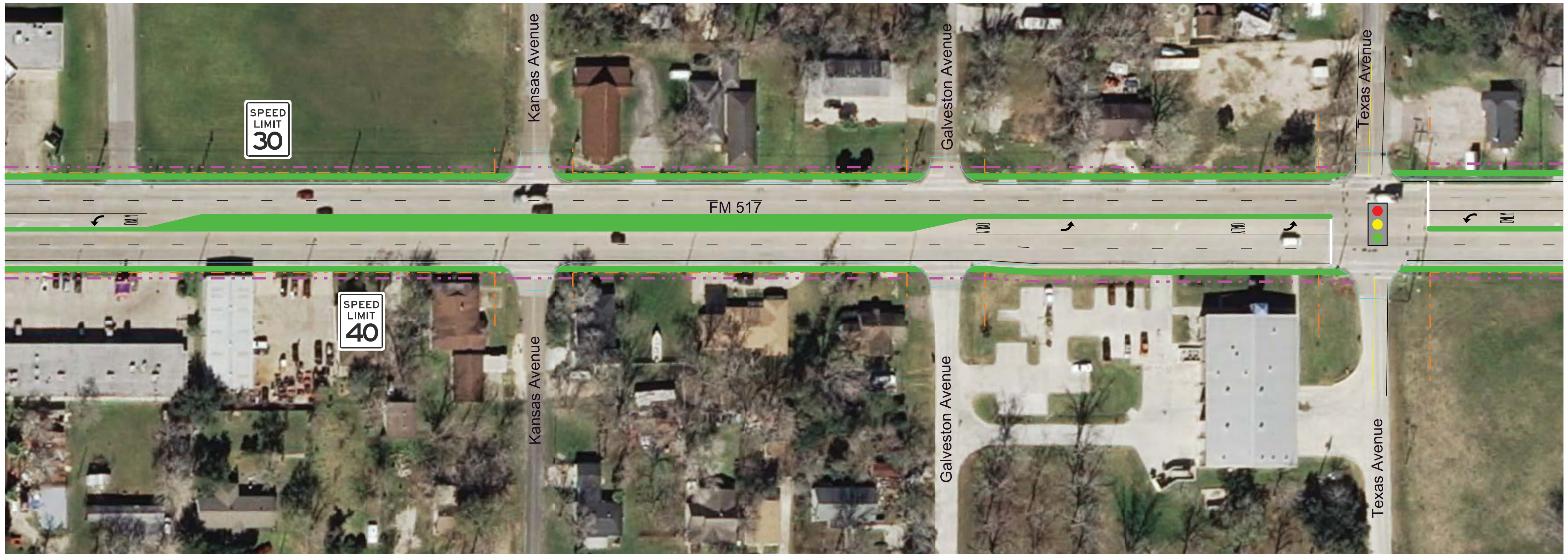


NOTE: Improvements to be determined based on long-term development plans





FM 517 AND SH 3 ACCESS MANAGEMENT PLAN



LEGEND

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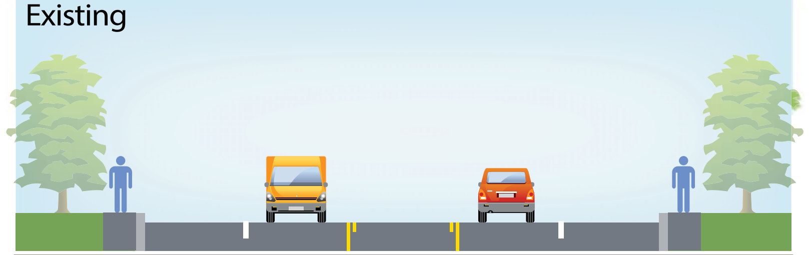
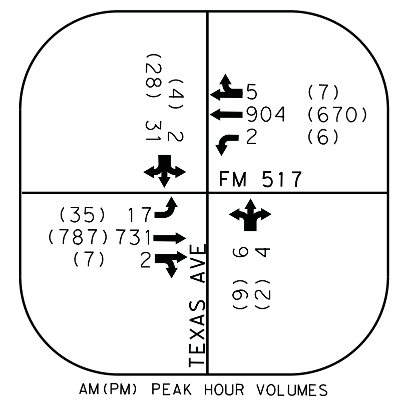
FM517 - Dickinson Ave to Gum Bayou

Existing

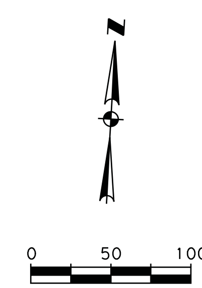


Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
			90' ROW			



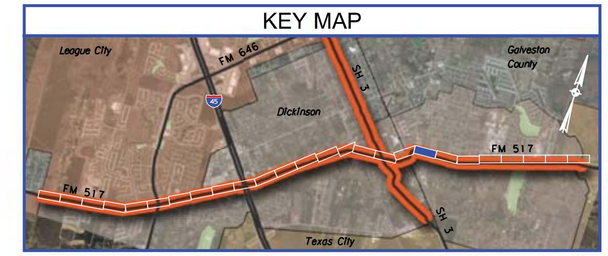
Long-term (15+ years) - additional right-of-way required

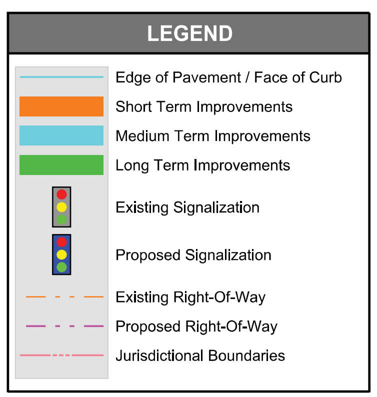
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	15'
				102' ROW				



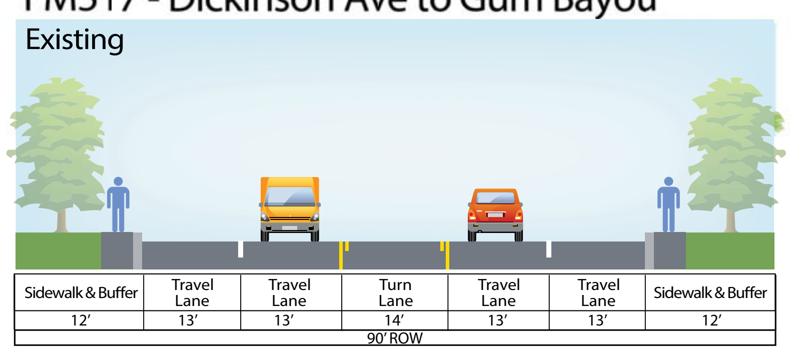
FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

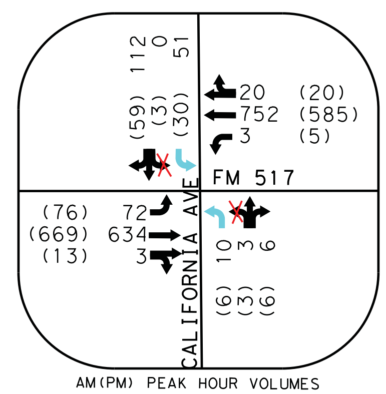
KEY MAP

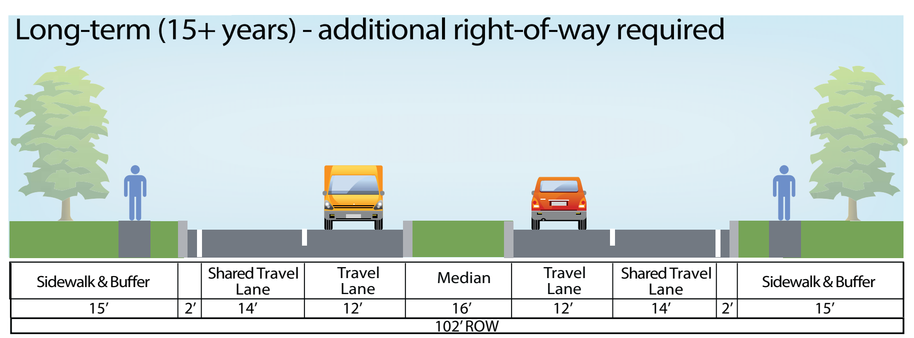


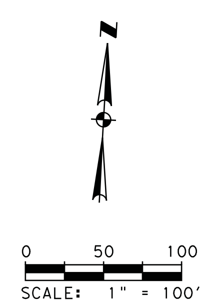


FM517 - Dickinson Ave to Gum Bayou









FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

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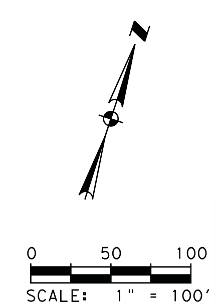
FM517 - Dickinson Ave to Gum Bayou

Existing

Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

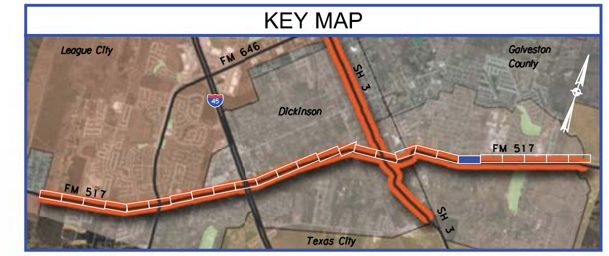
Long-term (15+ years) - additional right-of-way required

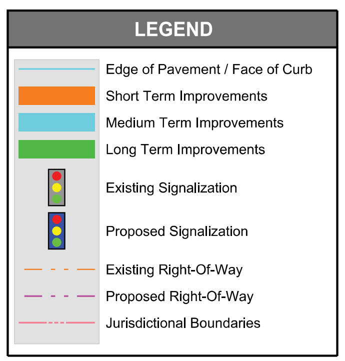
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	15'
102' ROW								



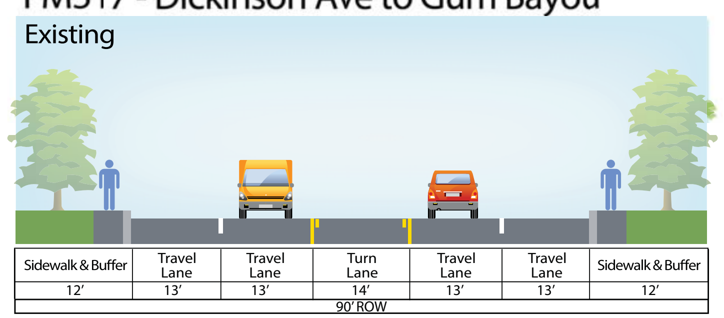
FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

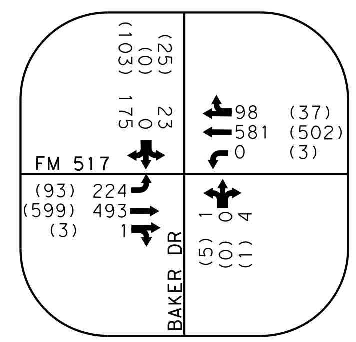
KEY MAP

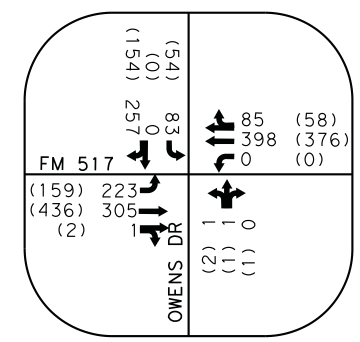


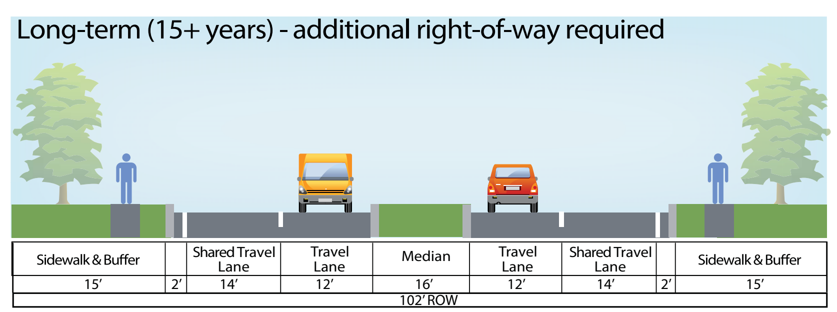


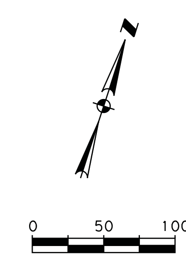
FM517 - Dickinson Ave to Gum Bayou











FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

LEGEND

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- Short Term Improvements
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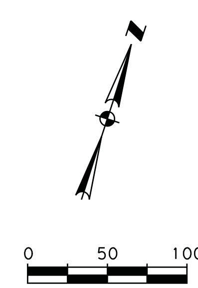
FM517 - Dickinson Ave to Gum Bayou

Existing

Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

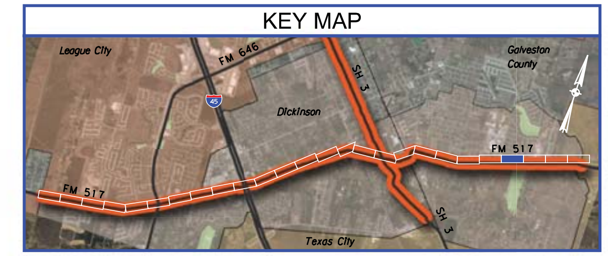
Long-term (15+ years) - additional right-of-way required

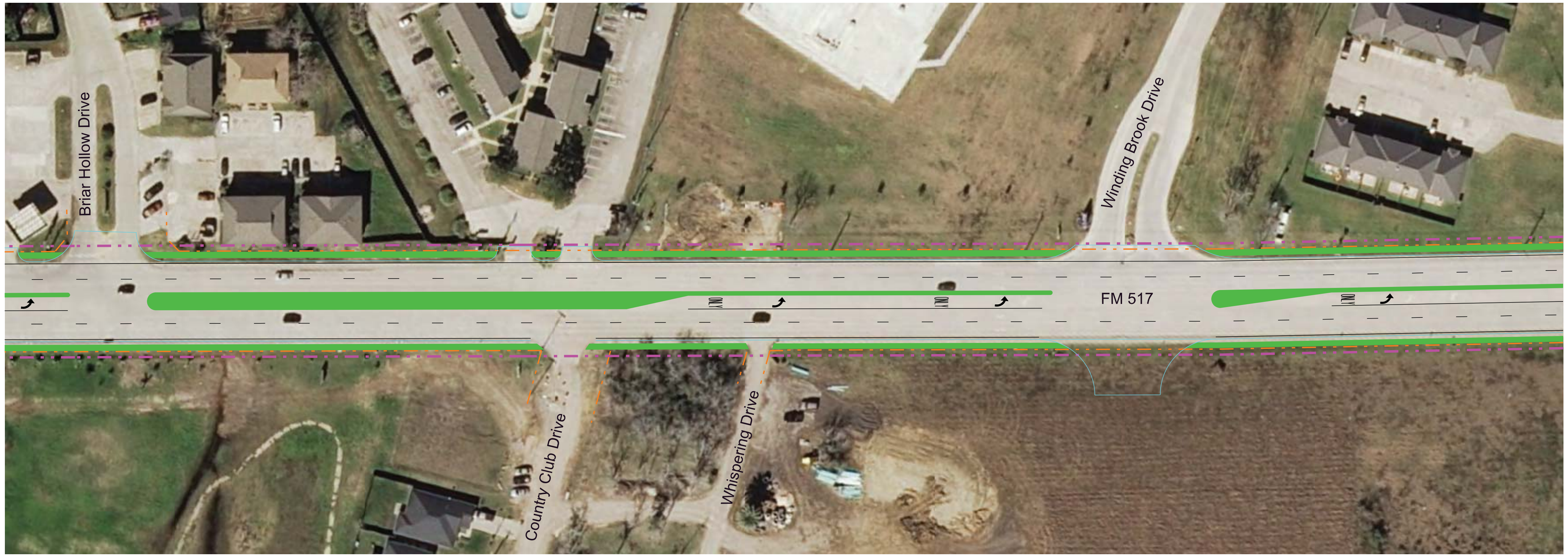
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	15'
102' ROW								



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP





LEGEND

- Edge of Pavement / Face of Curb
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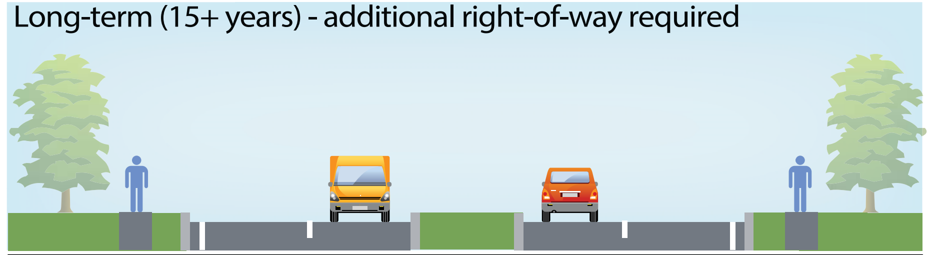
FM517 - Dickinson Ave to Gum Bayou

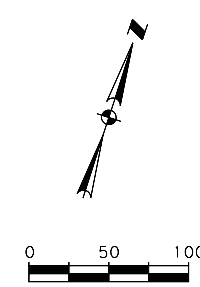
Existing

Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

Long-term (15+ years) - additional right-of-way required

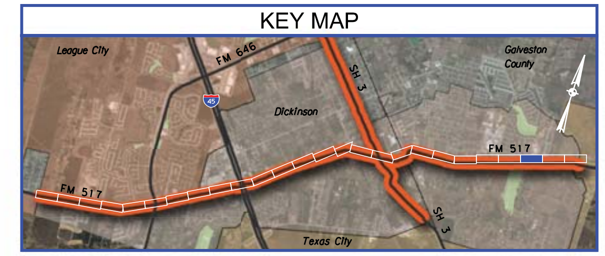


Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	15'
102' ROW								



FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



LEGEND

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FM517 - Dickinson Ave to Gum Bayou

Existing

Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
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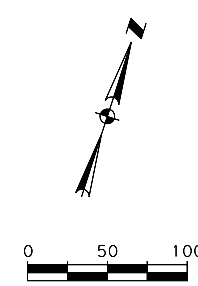
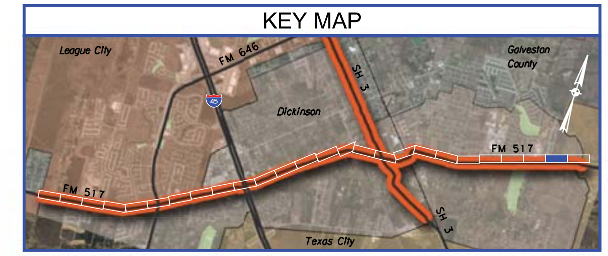
Long-term (15+ years) - additional right-of-way required

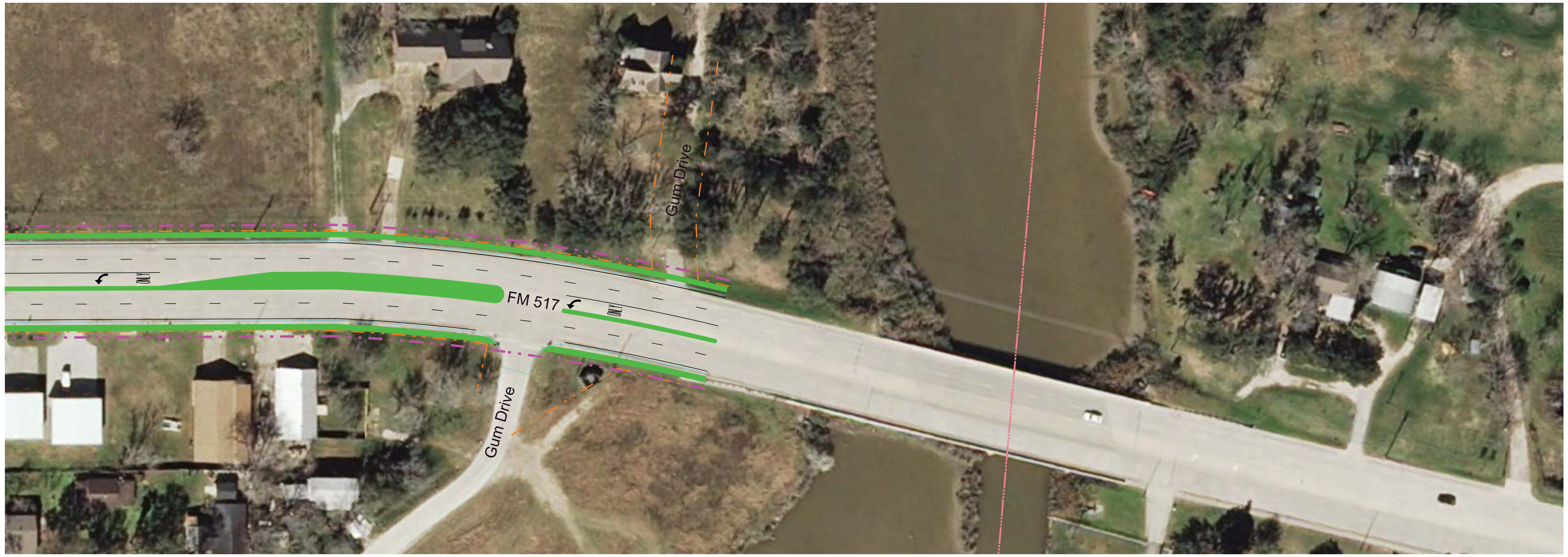
Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	15'
102' ROW								



FM 517 AND SH 3 ACCESS MANAGEMENT PLAN

KEY MAP





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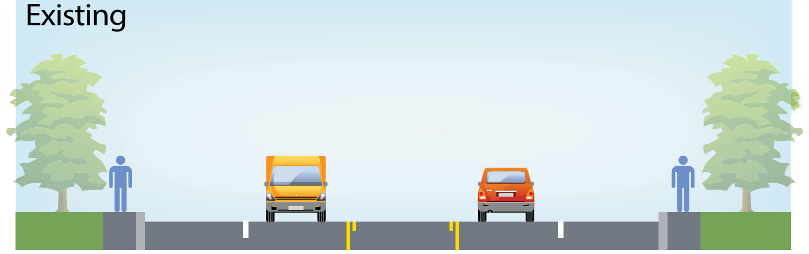
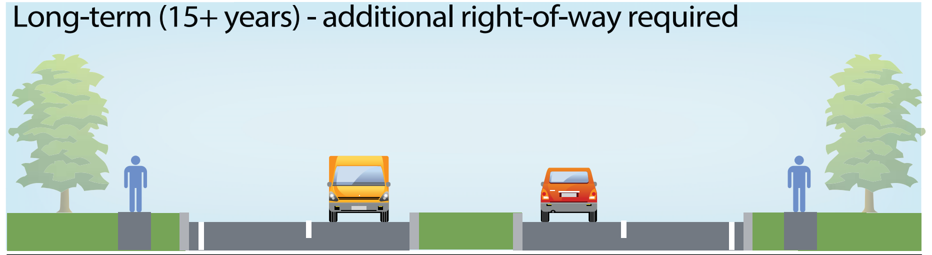
FM517 - Dickinson Ave to Gum Bayou

Existing

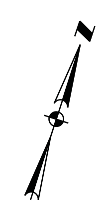


Sidewalk & Buffer	Travel Lane	Travel Lane	Turn Lane	Travel Lane	Travel Lane	Sidewalk & Buffer
12'	13'	13'	14'	13'	13'	12'
90' ROW						

Long-term (15+ years) - additional right-of-way required



Sidewalk & Buffer		Shared Travel Lane	Travel Lane	Median	Travel Lane	Shared Travel Lane		Sidewalk & Buffer
15'	2'	14'	12'	16'	12'	14'	2'	15'
102' ROW								

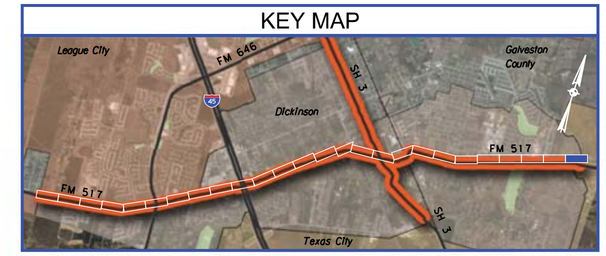


0 50 100

SCALE: 1" = 100'

FM 517 AND SH 3
ACCESS MANAGEMENT PLAN

KEY MAP



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Appendix B
Opinion of Probable Construction Cost

FM 517 QUANTITY SUMMARY - CEMETERY ROAD TO FM 646 (MEDIUM TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	5998.00	$40.00	$239,920.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	979.00	$15.19	$14,871.01
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	13534.00	$6.39	$86,423.39
100	2002	PREPARING ROW	STA	73.43	$1,369.28	$100,545.91
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	19581.00	$16.00	$313,296.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	19581.00	$200.00	$3,916,200.00
529	2002	CONC CURB (TY II)	LF	13876.00	$25.00	$346,900.00
529	2004	CONC CURB & GUTTER (TY II)	LF	13534.00	$18.63	$252,138.42
530	2010	DRIVEWAYS (CONC)	SY	1992.00	$59.45	$118,424.40
531	2024	CONC SIDEWALK (5")	SY	7754.00	$52.56	$407,550.24
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	14031	$0.35	$4,958.13
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	13348	$0.36	$4,805.28
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	4726	$0.70	$3,308.20
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	80	$6.33	$506.40
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	20	$114.26	$2,285.20
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	20	$133.01	$2,660.11
678	2001	PAV SURF PREP FOR MRK (4")	LF	27379	$0.11	$2,956.38
678	2003	PAV SURF PREP FOR MRK (8")	LF	4726	$0.27	$1,268.98
678	2006	PAV SURF PREP FOR MRK (24")	LF	80	$1.04	$83.49
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	20	$21.66	$433.18
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	20	$11.54	$230.81
528	2004	LANDSCAPE PAVERS	SY	3984.00	$45.93	$182,984.28
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	2014.00	$1.75	$3,524.50
500	2001	MOBILIZATION	LS	1.00	$600,627.43	$600,627.43
				SUBTOTAL		$6,006,274.33
				MOBILIZATION		$600,627.43
				TOTAL		$6,606,901.76

*2013 TxDOT Unit Costs

FM 517 QUANTITY SUMMARY - FM 646 TO SPRUCE (SHORT TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	2842.00	$40.00	$113,680.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY		$15.19	
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	9491.00	$6.39	$60,606.20
100	2002	PREPARING ROW	STA	55.60	$1,369.28	$76,131.73
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	1236.00	$16.00	$19,776.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	1236.00	$200.00	$247,200.00
529	2002	CONC CURB (TY II)	LF	10558.00	$25.00	$263,950.00
529	2004	CONC CURB & GUTTER (TY II)	LF	9491.00	$18.63	$176,817.33
530	2010	DRIVEWAYS (CONC)	SY	0.00	$59.45	$0.00
531	2024	CONC SIDEWALK (5")	SY	0.00	$52.56	$0.00
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	10974	$0.35	$3,877.88
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	7883	$0.36	$2,837.88
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	4432	$0.70	$3,102.40
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	204	$6.33	$1,291.32
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	25	$114.26	$2,856.50
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	25	$133.01	$3,325.14
678	2001	PAV SURF PREP FOR MRK (4")	LF	18857	$0.11	$2,036.18
678	2003	PAV SURF PREP FOR MRK (8")	LF	4432	$0.27	$1,190.04
678	2006	PAV SURF PREP FOR MRK (24")	LF	204	$1.04	$212.90
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	25	$21.66	$541.48
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	25	$11.54	$288.51
528	2004	LANDSCAPE PAVERS	SY	923.00	$45.93	$42,393.20
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	1919.00	$1.75	$3,358.25
500	2001	MOBILIZATION	LS	1.00	$102,547.29	$102,547.29
				SUBTOTAL		$1,025,472.94
				MOBILIZATION		$102,547.29
				TOTAL		$1,128,020.23

*2013 TxDOT Unit Costs

FM 517 QUANTITY SUMMARY - FM 646 TO SPRUCE (MEDIUM TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	218.00	$40.00	$8,720.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	1640.00	$15.19	$24,911.60
104	2021	REMOVING CONC (CURB)	LF	1963.00	$3.66	$7,186.78
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	9491.00	$6.39	$60,606.20
100	2002	PREPARING ROW	STA	55.60	$1,369.28	$76,131.73
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	19769.00	$16.00	$316,304.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	19769.00	$200.00	$3,953,800.00
529	2002	CONC CURB (TY II)	LF	1969.00	$25.00	$49,225.00
529	2004	CONC CURB & GUTTER (TY II)	LF	9491.00	$18.63	$176,817.33
530	2010	DRIVEWAYS (CONC)	SY	4188.00	$59.45	$248,976.60
531	2024	CONC SIDEWALK (5")	SY	4809.00	$52.56	$252,761.04
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	21948	$0.35	$7,755.76
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	7888	$0.36	$2,839.68
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	4997	$0.70	$3,497.90
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	204	$6.33	$1,291.32
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	29	$114.26	$3,313.54
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	29	$133.01	$3,857.16
678	2001	PAV SURF PREP FOR MRK (4")	LF	29831	$0.11	$3,221.15
678	2003	PAV SURF PREP FOR MRK (8")	LF	4997	$0.27	$1,341.74
678	2006	PAV SURF PREP FOR MRK (24")	LF	204	$1.04	$212.90
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	29	$21.66	$628.12
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	29	$11.54	$334.67
528	2004	LANDSCAPE PAVERS	SY	1141.00	$45.93	$52,405.89
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	1919.00	$1.75	$3,358.25
500	2001	MOBILIZATION	LS	1.00	$525,949.84	$525,949.84
				SUBTOTAL		$5,259,498.37
				MOBILIZATION		$525,949.84
				TOTAL		$5,785,448.21

*2013 TxDOT Unit Costs

FM 517 QUANTITY SUMMARY - SPRUCE TO TIMBER (LONG TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	7569.60	$40.00	$302,784.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	8275.20	$15.19	$125,700.29
104	2021	REMOVING CONC (CURB)	LF	817.60	$3.66	$2,993.33
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	14648.80	$6.39	$93,542.11
100	2002	PREPARING ROW	STA	74.48	$1,369.28	$101,983.65
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	8275.20	$16.00	$132,403.20
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	8275.20	$200.00	$1,655,040.00
529	2002	CONC CURB (TY II)	LF	13936.00	$25.00	$348,400.00
529	2004	CONC CURB & GUTTER (TY II)	LF	14648.80	$18.63	$272,907.14
530	2010	DRIVEWAYS (CONC)	SY	3894.40	$59.45	$231,522.08
531	2024	CONC SIDEWALK (5")	SY	7552.80	$52.56	$396,975.17
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	14835.2	$0.35	$5,242.31
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	11582.4	$0.36	$4,169.66
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	3116	$0.70	$2,181.20
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	246.4	$6.33	$1,559.71
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	22.4	$114.26	$2,559.42
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	22.4	$133.01	$2,979.33
678	2001	PAV SURF PREP FOR MRK (4")	LF	26417.6	$0.11	$2,852.57
678	2003	PAV SURF PREP FOR MRK (8")	LF	3116	$0.27	$836.68
678	2006	PAV SURF PREP FOR MRK (24")	LF	246.4	$1.04	$257.15
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	22.4	$21.66	$485.17
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	22.4	$11.54	$258.51
528	2004	LANDSCAPE PAVERS	SY	6096.00	$45.93	$279,988.00
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	1473.60	$1.75	$2,578.80
500	2001	MOBILIZATION	LS	1.00	$397,019.95	$397,019.95
				SUBTOTAL		$3,970,199.48
				MOBILIZATION		$397,019.95
				TOTAL		$4,367,219.43

*2013 TxDOT Unit Costs

FM 517 QUANTITY SUMMARY - TIMBER TO SH 3 (MEDIUM TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	1892.40	$40.00	$75,696.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	2068.80	$15.19	$31,425.07
104	2021	REMOVING CONC (CURB)	LF	204.40	$3.66	$748.33
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	3662.20	$6.39	$23,385.53
100	2002	PREPARING ROW	STA	18.62	$1,369.28	$25,495.91
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	2068.80	$16.00	$33,100.80
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	2068.80	$200.00	$413,760.00
529	2002	CONC CURB (TY II)	LF	3484.00	$25.00	$87,100.00
529	2004	CONC CURB & GUTTER (TY II)	LF	3662.20	$18.63	$68,226.79
530	2010	DRIVEWAYS (CONC)	SY	973.60	$59.45	$57,880.52
531	2024	CONC SIDEWALK (5")	SY	1888.20	$52.56	$99,243.79
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	3708.8	$0.35	$1,310.58
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	2895.6	$0.36	$1,042.42
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	779	$0.70	$545.30
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	61.6	$6.33	$389.93
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	5.6	$114.26	$639.86
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	5.6	$133.01	$744.83
678	2001	PAV SURF PREP FOR MRK (4")	LF	6604.4	$0.11	$713.14
678	2003	PAV SURF PREP FOR MRK (8")	LF	779	$0.27	$209.17
678	2006	PAV SURF PREP FOR MRK (24")	LF	61.6	$1.04	$64.29
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	5.6	$21.66	$121.29
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	5.6	$11.54	$64.63
528	2004	LANDSCAPE PAVERS	SY	1524.00	$45.93	$69,997.00
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	368.40	$1.75	$644.70
500	2001	MOBILIZATION	LS	1.00	$99,254.99	$99,254.99
				SUBTOTAL		$992,549.87
				MOBILIZATION		$99,254.99
				TOTAL		$1,091,804.86

*2013 TxDOT Unit Costs

FM 517 QUANTITY SUMMARY - FM 1266 TO GUM BAYOU (LONG TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	8400.00	$40.00	$336,000.00
104	2015	REMOVING CONC (SIDEWALKS)	SY	11520.00	$11.00	$126,720.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	382.00	$15.19	$5,802.58
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	20612.00	$6.39	$131,621.02
100	2002	PREPARING ROW	STA	103.68	$1,369.28	$141,966.50
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	6912.00	$16.00	$110,592.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	6912.00	$200.00	$1,382,400.00
529	2002	CONC CURB (TY II)	LF	19158.00	$25.00	$478,950.00
529	2004	CONC CURB & GUTTER (TY II)	LF	20612.00	$18.63	$384,001.56
530	2010	DRIVEWAYS (CONC)	SY	5270.00	$59.45	$313,301.50
531	2024	CONC SIDEWALK (5")	SY	9582.00	$52.56	$503,629.92
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	20532	$0.35	$7,255.39
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	18130	$0.36	$6,526.80
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	5226	$0.70	$3,658.20
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	286	$6.33	$1,810.38
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	20	$114.26	$2,285.20
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	20	$133.01	$2,660.11
678	2001	PAV SURF PREP FOR MRK (4")	LF	38662	$0.11	$4,174.72
678	2003	PAV SURF PREP FOR MRK (8")	LF	5226	$0.27	$1,403.23
678	2006	PAV SURF PREP FOR MRK (24")	LF	286	$1.04	$298.47
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	20	$21.66	$433.18
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	20	$11.54	$230.81
528	2004	LANDSCAPE PAVERS	SY	5552.00	$45.93	$255,002.19
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	2847.00	$1.75	$4,982.25
500	2001	MOBILIZATION	LS	1.00	$420,570.60	$420,570.60
				SUBTOTAL		$4,205,706.03
				MOBILIZATION		$420,570.60
				TOTAL		$4,626,276.63

*2013 TxDOT Unit Costs

SH 3 QUANTITY SUMMARY - HUGHES TO DEATS (MEDIUM TERM)						
TXDOT ITEM	**CODE**	**DESCRIPTION**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL**
104	2001	REMOVING CONC (PAV)	SY	7974.00	$40.00	$318,960.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	931.00	$15.19	$14,141.89
104	2015	REMOVING CONC (SIDEWALKS)	SY	4683.00	$11.00	$51,513.00
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	16180.00	$6.39	$103,319.82
100	2002	PREPARING ROW	STA	84.30	$1,369.28	$115,429.94
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	6557.00	$16.00	$104,912.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	6557.00	$200.00	$1,311,400.00
529	2002	CONC CURB (TY II)	LF	15675.00	$25.00	$391,875.00
529	2004	CONC CURB & GUTTER (TY II)	LF	16180.00	$18.63	$301,433.40
530	2010	DRIVEWAYS (CONC)	SY	5495.00	$59.45	$326,677.75
531	2024	CONC SIDEWALK (5")	SY	7284.00	$52.56	$382,847.04
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	16640	$0.35	$5,880.08
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	12032	$0.36	$4,331.52
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	4649	$0.70	$3,254.30
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	236	$6.33	$1,493.88
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	33	$114.26	$3,770.58
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	33	$133.01	$4,389.19
678	2001	PAV SURF PREP FOR MRK (4")	LF	28672	$0.11	$3,096.00
678	2003	PAV SURF PREP FOR MRK (8")	LF	4649	$0.27	$1,248.30
678	2006	PAV SURF PREP FOR MRK (24")	LF	236	$1.04	$246.29
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	33	$21.66	$714.75
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	33	$11.54	$380.84
528	2004	LANDSCAPE PAVERS	SY	6068.00	$45.93	$278,701.97
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	1906.00	$1.75	$3,335.50
				SUBTOTAL		$3,733,353.03
				MOBILIZATION		$373,335.30
				TOTAL		$4,106,688.33

*2013 TxDOT Unit Costs

SH3 QUANTITY SUMMARY - DEATS TO FM 646 (LONG TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	5486.00	$40.00	$219,440.00
104	2015	REMOVING CONC (SIDEWALKS)	SY	11086.00	$11.00	$121,946.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	787.00	$15.19	$11,954.53
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	10407.00	$6.39	$66,455.46
100	2002	PREPARING ROW	STA	55.43	$1,369.28	$75,898.95
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	4311.00	$16.00	$68,976.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	4311.00	$200.00	$862,200.00
529	2002	CONC CURB (TY II)	LF	10578.00	$25.00	$264,450.00
529	2004	CONC CURB & GUTTER (TY II)	LF	10407.00	$18.63	$193,882.41
530	2010	DRIVEWAYS (CONC)	SY	3965.00	$59.45	$235,719.25
531	2024	CONC SIDEWALK (5")	SY	5207.00	$52.56	$273,679.92
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	10866	$0.35	$3,839.72
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	8540	$0.36	$3,074.40
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	3007	$0.70	$2,104.90
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	100	$6.33	$633.00
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	18	$114.26	$2,056.68
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	18	$133.01	$2,394.10
678	2001	PAV SURF PREP FOR MRK (4")	LF	19406	$0.11	$2,095.46
678	2003	PAV SURF PREP FOR MRK (8")	LF	3007	$0.27	$807.41
678	2006	PAV SURF PREP FOR MRK (24")	LF	100	$1.04	$104.36
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	18	$21.66	$389.87
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	18	$11.54	$207.73
528	2004	LANDSCAPE PAVERS	SY	4190.00	$45.93	$192,445.82
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	1296.00	$1.75	$2,268.00
500	2001	MOBILIZATION	LS	1.00	$260,702.40	$260,702.40
				SUBTOTAL		$2,607,023.97
				MOBILIZATION		$260,702.40
				TOTAL		$2,867,726.37

*2013 TxDOT Unit Costs

SH 3 QUANTITY SUMMARY - FM 646 TO WALKER (LONG TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	10284.00	$40.00	$411,360.00
104	2015	REMOVING CONC (SIDEWALKS)	SY		$11.00	
104	2017	REMOVING CONC (DRIVEWAYS)	SY	761.00	$15.19	$11,559.59
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	22200.00	$6.39	$141,761.43
100	2002	PREPARING ROW	STA	113.64	$1,369.28	$155,604.49
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	7576.00	$16.00	$121,216.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	7576.00	$200.00	$1,515,200.00
529	2002	CONC CURB (TY II)	LF	21173.00	$25.00	$529,325.00
529	2004	CONC CURB & GUTTER (TY II)	LF	22200.00	$18.63	$413,586.00
530	2010	DRIVEWAYS (CONC)	SY	2524.00	$59.45	$150,051.80
531	2024	CONC SIDEWALK (5")	SY	11710.00	$52.56	$615,477.60
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	22484	$0.35	$7,945.17
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	20528	$0.36	$7,390.08
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	6346	$0.70	$4,442.20
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	250	$6.33	$1,582.50
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	36	$114.26	$4,113.36
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	36	$133.01	$4,788.20
678	2001	PAV SURF PREP FOR MRK (4")	LF	43012	$0.11	$4,644.44
678	2003	PAV SURF PREP FOR MRK (8")	LF	6346	$0.27	$1,703.96
678	2006	PAV SURF PREP FOR MRK (24")	LF	250	$1.04	$260.90
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	36	$21.66	$779.73
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	36	$11.54	$415.46
528	2004	LANDSCAPE PAVERS	SY	7668.00	$45.93	$352,189.63
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	2616.00	$1.75	$4,578.00
500	2001	MOBILIZATION	LS	1.00	$445,997.55	$445,997.55
				SUBTOTAL		$4,459,975.55
				MOBILIZATION		$445,997.55
				TOTAL		$4,905,973.10

*2013 TxDOT Unit Costs

SH 3 QUANTITY SUMMARY - WALKER TO FM 518 (SHORT TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	900.00	$40.00	$36,000.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	967.00	$15.19	$14,688.73
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	2500.00	$6.39	$15,964.13
100	2002	PREPARING ROW	STA	14.00	$1,369.28	$19,169.86
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	0.00	$16.00	$0.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	0.00	$200.00	$0.00
529	2002	CONC CURB (TY II)	LF	2551.00	$25.00	$63,775.00
529	2004	CONC CURB & GUTTER (TY II)	LF	2500.00	$18.63	$46,575.00
530	2010	DRIVEWAYS (CONC)	SY	1079.00	$59.45	$64,146.55
531	2024	CONC SIDEWALK (5")	SY	1477.00	$52.56	$77,631.12
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	5206	$0.35	$1,839.64
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	2248	$0.36	$809.28
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	850	$0.70	$595.00
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	125	$6.33	$791.25
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	8	$114.26	$914.08
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	8	$133.01	$1,064.05
678	2001	PAV SURF PREP FOR MRK (4")	LF	7454	$0.11	$804.88
678	2003	PAV SURF PREP FOR MRK (8")	LF	850	$0.27	$228.23
678	2006	PAV SURF PREP FOR MRK (24")	LF	125	$1.04	$130.45
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	8	$21.66	$173.27
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	8	$11.54	$92.32
528	2004	LANDSCAPE PAVERS	SY	538.00	$45.93	$24,710.23
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	362.00	$1.75	$633.50
500	2001	MOBILIZATION	LS	1.00	$37,073.66	$37,073.66
				SUBTOTAL		$370,736.58
				MOBILIZATION		$37,073.66
				TOTAL		$407,810.24

*2013 TxDOT Unit Costs

SH 3 QUANTITY SUMMARY - WALKER TO FM 518 (MEDIUM TERM)						
TXDOT ITEM	CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
104	2001	REMOVING CONC (PAV)	SY	900.00	$40.00	$36,000.00
104	2017	REMOVING CONC (DRIVEWAYS)	SY	967.00	$15.19	$14,688.73
104	2022	REMOVING CONC (CURB AND GUTTER)	LF	2500.00	$6.39	$15,964.13
100	2002	PREPARING ROW	STA	14.00	$1,369.28	$19,169.86
247	2064	FL BS (CMP IN PLC)(TY A GR 4) (6")	SY	3733.00	$16.00	$59,728.00
360	2001	CONC PVMT (CONT REINF-CRCP)(8")	SY	3733.00	$200.00	$746,600.00
529	2002	CONC CURB (TY II)	LF	2551.00	$25.00	$63,775.00
529	2004	CONC CURB & GUTTER (TY II)	LF	2500.00	$18.63	$46,575.00
530	2010	DRIVEWAYS (CONC)	SY	1079.00	$59.45	$64,146.55
531	2024	CONC SIDEWALK (5")	SY	1477.00	$52.56	$77,631.12
666	2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	5206	$0.35	$1,839.64
666	2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	2248	$0.36	$809.28
666	2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	850	$0.70	$595.00
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	125	$6.33	$791.25
666	2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	8	$114.26	$914.08
666	2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	8	$133.01	$1,064.05
678	2001	PAV SURF PREP FOR MRK (4")	LF	7454	$0.11	$804.88
678	2003	PAV SURF PREP FOR MRK (8")	LF	850	$0.27	$228.23
678	2006	PAV SURF PREP FOR MRK (24")	LF	125	$1.04	$130.45
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	8	$21.66	$173.27
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	8	$11.54	$92.32
528	2004	LANDSCAPE PAVERS	SY	538.00	$45.93	$24,710.23
160	2006	FURNISHING AND PLACING TOPSOIL (3")	SY	362.00	$1.75	$633.50
500	2001	MOBILIZATION	LS	1.00	$117,706.46	$117,706.46
				SUBTOTAL		$1,177,064.58
				MOBILIZATION		$117,706.46
				TOTAL		$1,294,771.04

*2013 TxDOT Unit Costs